

THE No.1 SCALE AIRCRAFT REFERENCE MAGAZINE

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The propeller hubs and cuffs are matt black, with aluminium blades, and white/red/white tips. The red stripe around the fuselage carries 'Propeller' in it in yellow, with 'Danger' each side in red on a white background. The stripe on the front of the main undercarriage fairing appears only on the port side, just below the bright orange 'remove before flight' tag is a red and black warning 'box'. A yellow and black 'Rescue' arrow points vertically upward just above the squadron badge, port side only

RNZAF Hercules

by Paul Adams

To replace the Hastings and DC-6B, then used for long range freight and personnel transport work respectively, the RNZAF selected the Lockheed C-130E Hercules in the early 1960s. At one time it was suggested that up to twelve aircraft might be bought, replacing not only these two types, but also the Bristol Freighter; the total including five examples of a proposed maritime patrol version which would have replaced the Sunderland flying boats still being used by No.5 Squadron. An initial order for these three transports was approved in June 1963, but the plan for five patrol versions was dropped in October as this variant still existed only on paper, while the fully developed Orion was already in service with the US Navy, five of these being bought instead.

The C-130E was in fact never used by the RNZAF, NZ7001-03 actually being completed as the first examples of the more powerful, but generally similar, C-130H. NZ7001 making the maiden flight of this variant on 19th November 1964, and then being used for early performance tests before being handed over to the RNZAF. From mid-1964 RNZAF air and ground crew had been in the United States for training in their new mounts, which they flew into New Zealand on 14th April 1965. Going to No.40 Squadron at Whenuapai, Auckland, they joined the sole remaining DC-6, and a communications Devon.

One of the first tasks for the new transports was to be the deployment of No.161 Battery, Royal New Zealand Artillery to Vietnam in early July, these being the first New Zealand combat troops in that theatre, although non-combatant Engineers had been in the country since the previous year. They then operated regular supply flights in support of the New Zealand forces until the final withdrawal in 1972, and later helped to evacuate New Zealanders from Saigon prior to the fall of South Vietnam in 1975. Similar flights, carrying personnel and equipment, were made to Singapore where New Zealand had forces stationed in support of regional defence commitments, and to Britain and America.

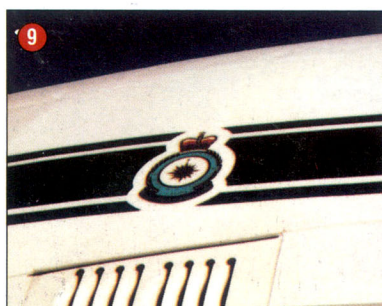
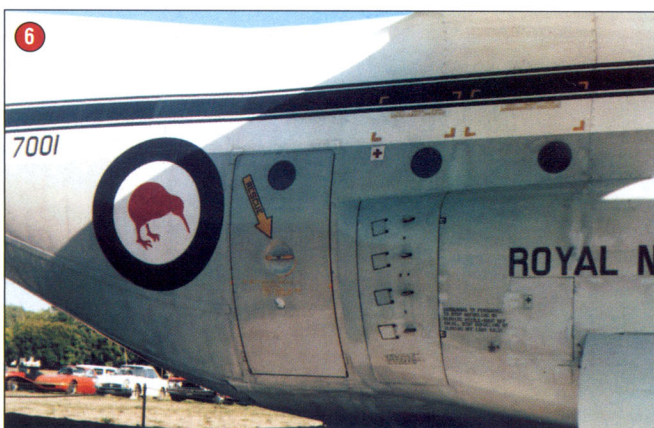
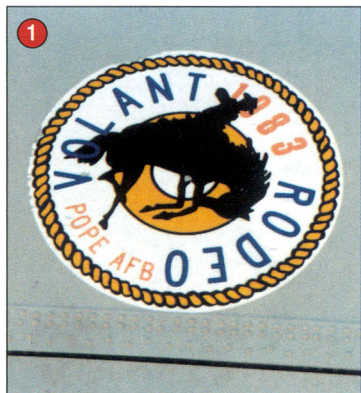
In 1966 it was decided to buy a further two Hercules, the order being placed the following year. These arrived at Whenuapai on 9th January 1969, the last DC-6 having been sold a few months

before. Whenever RNZAF aircraft deploy overseas for exercises they are usually accompanied by a Hercules or two, carrying ground crews and support equipment. Other major peace-time roles for No.40 Squadron have included search and rescue, looking for lost yachts and fishing boats; carrying food, medical supplies, and housing materials to cyclone hit islands in the Pacific, and even to Australia after Cyclone Tracy levelled Darwin on Christmas Day in 1974. Their ability to carry a complete Iroquois helicopter means that even the most isolated areas can be reached by relief teams; other disaster/civil assistance work has meant flights to Bangladesh, Burma, Cambodia and India.

Looking at a map of New Zealand it will be seen that New Zealand consists of two main islands, normally linked by Railway-operated ferries. When these periodically go on strike the air force gets called in to back up the airlines by flying people and cars across Cook Strait as the airlines can not always handle the extra load, nor do they have that many aircraft capable of carrying vehicles, hence the use of the Hercules,

NZ7001 is white and light grey, with a black nose, and dark blue cheatline. The 'last two' of the serial is repeated below the windscreen, with the squadron badge in the cheatline, and a 1983-vintage Volant Rodeo badge above the crew entry door, which has a yellow and black 'Rescue' arrow on it. The aerial above the cockpit is white with a deep cream leading edge, while that on the side is black. The vertical stripe below the windows is red whilst most of the stencilling is black, with black and yellow rescue markings, and red markings





1. This badge, indicating participation in the Volant Rodeo tactical transport competition, was still being worn by NZ7001 in April 1985. The middle circle and rope are yellow edged with black, superimposed on these is a black horse and rider. 'Volant Rodeo' is applied in blue, extending across the tail of the horse; 'Pope AFB' and 1983, the latter partly obscured by the head of the cowboy, is a salmon pink/orange. The decal is slightly chipped around the edges, and in a couple of other places

2. The twin nose wheels from the rear, the door hinges aft under fuselage. The wheel hubs and well interiors are white, while the light is red

3. Outer port engine, the area aft of the exhaust port is painted black to reduce staining. Stencilling is black, with red panel outlines. Note the small strut

4. Port main undercarriage bay from the rear. Wheel well interiors and wheel hubs are white, the outer doors being edged in red. The doors in the rear of the fairings on both sides are air deflectors, used when paratroops exit the aircraft from the side doors

5. The fin is white with a light grey leading edge and rudder. The panel near the top is a dirty gold/bronze colour. The 40 Squadron compass is black and gold; the number 40 is black, but some aircraft have also used red. Atop the fin is a red light

6. The Kiwi has three front toes and one rear toe, with a slightly curved beak. Note that the far leg is not actually joined to the body. The black and yellow RESCUE arrow points to a yellow handle, below which is some yellow stencilling. The rear 'Cut Here For Emergency Rescue' panel is shorter on the starboard side than on the port

7. Outer starboard engine exhaust and roundel, the toes of this Kiwi differ slightly from those on the fuselage. The upper rear corner of the fuel tank pylon is cut away to allow clearance for the flaps

8. Starboard main undercarriage fairing, with a landing light mounted on the outer door, which is white edged with red. The remove before flight tag is orange, and the wheel chocks are yellow with bare wood showing through at the edges

9. The Squadron badge is gold with black detailing, a light blue ring, and a red interior to the crown. Note how the cut-way cheatline carefully follows the contours of the badge. The motto reads 'Ki Nga Hau E Wha' [To the Four Winds]

Andover, etc. In February 1981 an airline strike meant that the RNZAF and RAAF had to operate a similar service across the Tasman Sea.

In 1979 NZ7001 attended the International Air Tattoo at Greenham Common to celebrate the 25th birthday of the Hercules, and won the top Concours d'Elegance award for the best presented Hercules, despite being the oldest aircraft there and having come the greatest distance. Also scheduled for 1979, but postponed until February 1980 due to heavy commitments at the time, was the presentation of the Squadron Standard, which is awarded to British and Commonwealth squadrons after 25 years of service. The Hercules has also established several firsts during its service with the RNZAF, including the first RNZAF aircraft to fly to the Antarctic, with supplies for New Zealand scientific teams on the ice, on 27th October 1965. These Ice Cube missions are flown from Harewood, Christchurch during the southern summer; similar missions are flown by the USN and RAAF, although, as the American aircraft are equipped with skis and are winterised they can operate in conditions that would be too extreme for the unmodified RNZAF planes. NZ7002 was the first RNZAF aircraft to fly into mainland China, on 25th July 1973 with material to establish an Embassy in Peking following recognition of the Communist government. In December NZ7002 made three flights to the USSR from the RAF Hercules base at Lyneham with materials for the New Zealand Embassy in Moscow, the first on the 5th December; another RNZAF first for the Hercules. More recently they have provided support for New Zealand peace-keeping forces around the world: in Rhodesia in 1979/80 to help monitor the cease-fire and elections; to the Sinai Peninsula in 1982/86; and currently, Iran and Iraq where Army and Air Force personnel are serving with the UN.

To extend the lives of the Hercules, the aircraft were sent back to the USA for modification of their wing centre sections between August 1972 and August 1973. In 1981 they returned to the USA, this time for work on their outer wing panels. With the arrival of the Boeing 727 for long range transport duties in 1981, the Hercules was able to concentrate more on the tactical role, leading to a run-down in the Andover fleet, this change leading to the adoption of tactical camouflage in 1986. In recent years it has been suggested that more Hercules may be bought to allow the complete phase-out of the Andover, and/or that some may be converted to tankers to support the Skyhawk fleet, but nothing has yet come of these proposals.

The photographs were taken at Whenuapai in April 1985, all show NZ7001 in standard late-period markings.

Colours

The early aircraft were painted aluminium, with a white fuselage top, and black-edged dull aluminium walkways; a dark blue and white cheatline, with a break for squadron badge just aft of the cockpit windows, ran the length of the fuselage. The areas immediately aft of the engine exhausts on the lower surface of the wings was painted black to camouflage the exhaust stains. The propeller blades were aluminium with yellow tips; the spinners, cuffs, and leading edges being matt black. 'Royal New Zealand Air Force' appeared on the main undercarriage fairings, and the serial on the rear fuselage, the 'last two' being repeated on the fin and on the nose below the windscreen, all in black. National insignia comprised silver fern leaf roundels in six positions, and fin flashes.

The first change to this scheme was the adoption of white/red/white markings on the propeller blade tips. At the end of 1970 Kiwi roundels were introduced. By 1977 the 'last two' on the fin were being replaced by a black and gold compass, topped by Prince-of-Wales feathers, and flanked by the squadron number 40, the latter is usually black, although red has been used (see



Scale Models International, June 1985 for a colour photo of NZ7001 with this marking). Finally came the change to light grey undersurfaces. In early 1986 NZ7002 acquired a camouflage finish, and the old grey/white scheme began to slowly disappear.

Kits

Italeri do several versions of the Hercules in both 1/48th and 1/72nd scales. The Airfix kit, which was first issued as an RAF C-130K with Bristol Bloodhound SAM, and then as a USAF C-130E/H, is currently available in AC-130H gunship guise (Note that the recent Hercules kit released by Airfix is, in fact, the Italeri tooling - Ed). Of rather more manageable size is the 1/144 scale Revell model which has also been issued in several forms, and the 1/200th scale versions from Hasegawa. None of these contain RNZAF markings.

Decals

Microscale (or Superscale) sheet 72-508 contains markings for both RNZAF and RAAF Hercules. The RNZAF markings, for NZ7001, are basically good; the No.40 Squadron compass on the fin is excellent; and the Kiwi roundels are passable, although the beak and feet could do with some minor retouching; there is also an IAT 'zap' for the port side of the nose. Unfortunately the size of the markings has meant that there is no room on the sheet for the full-length fuselage cheatline (the much smaller RAAF version is supplied), so this will either have to be masked and hand painted or cut from decal stripes, Micro thoughtfully providing a 1/72nd scale enlargement of this on the instruction sheet to show the correct width. Apart from this, there should be a larger gap between the letters and numbers of the serial while the numbers themselves should be closer together; the nose number is dark blue rather than black, which may or may not be correct, the squadron badge is also rather nondescript and needs touching up. Roodecals of Australia produced a joint RNZAF/RAAF Hercules sheet at one time. For any other scale the markings will have to be made up from oddments, the compass badge probably having to be hand painted. **MAM**

A black and yellow 'Rescue' arrow is superimposed on the red propeller warning band around the fuselage on the starboard side only. The main undercarriage fairing lacks a red band on this side. The dark area atop the engine nacelles is a shadow cast by the propeller blades, not part of the colour scheme

RNZAF Serial	USAF Serial	Construction Number	Delivery Date	Notes
NZ7001	64-15094	4052	14/4/65	First C-130H
NZ7002	64-15095	4053	14/4/65	First flight 19/11/64
NZ7003	64-15096	4054	14/4/65	First in camouflage
NZ7004	68-8218	4312	9/1/69	Second in camouflage
NZ7005	68-8219	4313	9/1/69	



B-36 Peacemaker

by Glenn Sands

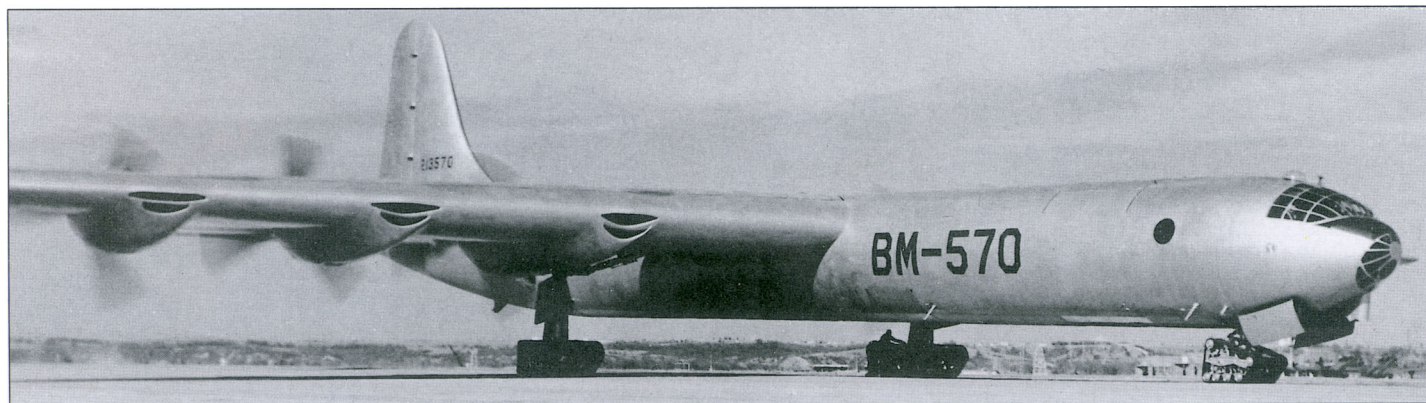
In 1941 the United States was confronted with the possibility that Nazi Germany would control all of Europe and that in the case of war with the Axis, only bases in America itself would be available to strike at enemy targets. With this in mind on April 11th 1941, the United States Army Air Corps (USAAC) announced a design competition for a bomber that could carry a 10,000 lb load half-way, over an estimated mission range of 10,000 miles. Also included in the specifications were the need for a speed of between 300 to 400 mph and the ability to operate from a runway of less than 5,000 ft. At the time the largest bomber in the USAAC was the Boeing B-17C Flying Fortress, which had a bomb load of 4,000lb and a range of 2,000 miles. Since 1936 a much larger bomber had been under development, the Douglas XB-19, designed to carry a bomb load of 6,000lb over a range of 7,300 miles. First flown in June 1941, the XB-19 was the result of a long-range bomber development programme

beginning in 1934 with the Boeing XB-15. The larger Douglas aircraft, with a 212ft wing span and a gross weight of 140,000lb was the first design to utilise a tricycle undercarriage, tail gunner, and power operated turrets which were later to become standard on all American heavy bombers.

By September 1940, Consolidated Aircraft Corporation was commencing with work on its prototype entry, the XB-32 long range bomber following an order from the USAAC. Planned as a counterpart for the B-29 Superfortress, the XB-32 was to be capable of delivering 2,000lb of bombs and have a range of 4,450 miles, by this stage Consolidated's design was known as the Model 35, and was to be powered by four engines mounted in a wing span of 164ft. The Model 35 design was later modified to include six pusher engines, and it was to be this final design that was presented to the Air Material Division on October 6th 1941, as the Model 36 with other designs from Boeing, Douglas and Northrop.

Colourful unit markings were common throughout all Peacemaker Wings. This B-36 wears the 4925th Test Group Atomic badge whilst serving with the Special Weapons Command in connection with the Continental Nuclear Test Program, at Indian Springs AFB, Nevada, in March 1953

The prototype XB-36 seen later in its career. Note the flush type canopy. By this stage of its test life the aircraft had received a 'buzz number' on the fuselage. Note the tracked-type landing gear units which were to reduce ground pressure, but were never adopted for service

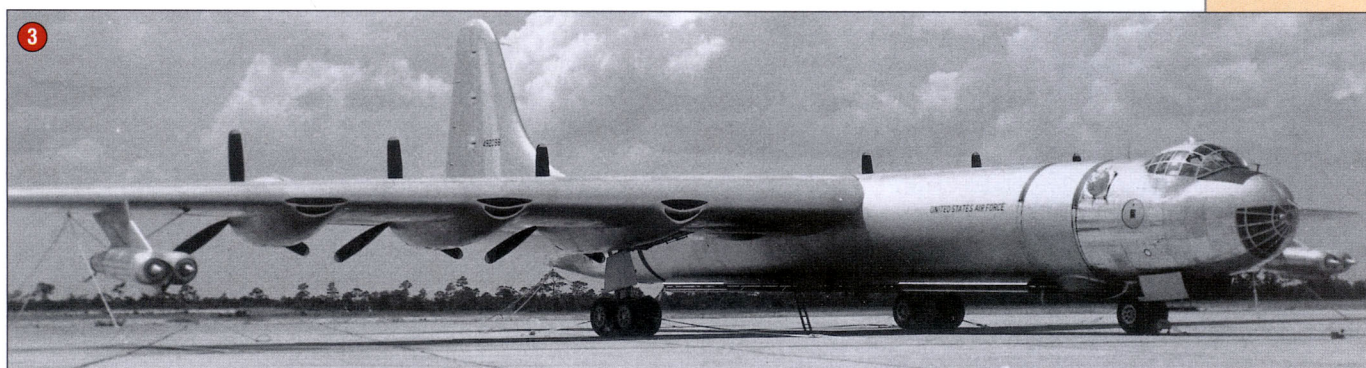
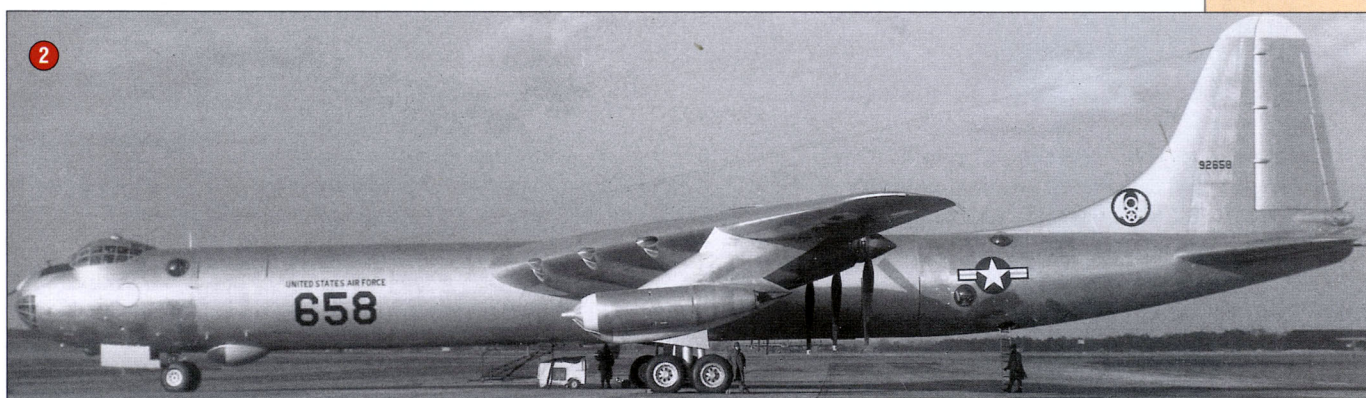




All photos © Glenn Sands
unless otherwise stated

1. A B-36 takes off from Ramey AFB, Puerto Rico, on September 30th 1953 for a practice bombing mission

2. A Convair B-36 at RAF Lakenheath, Suffolk during 'Operation UK' on January 20th 1951. Overseas deployments were regularly practiced by SAC Peacemaker crews, often with only a few hours warning!



3. Seen at Eglin AFB, Florida in September 1950 in this B-36D-1. Note the differing sizes of the engine intakes

4. The first B-36A, BM-004, which flew before the YB-36, had the revised canopy area and the new four-wheeled main undercarriage. Note the differing skin tones at the rear of the fuselage



On the recommendation of Brigadier General George S. Kenney, the USAAF issued Consolidated a contract, along with Northrop, on October 25th, and it was finally approved on November 15th 1941. The order was for two XB-36 aircraft, the first of which was to be delivered within 30 months, or by May 1944. Total engineering and construction costs were to total no more than \$15 million, and each manufacturer was given an \$800,000 fee to commence construction.

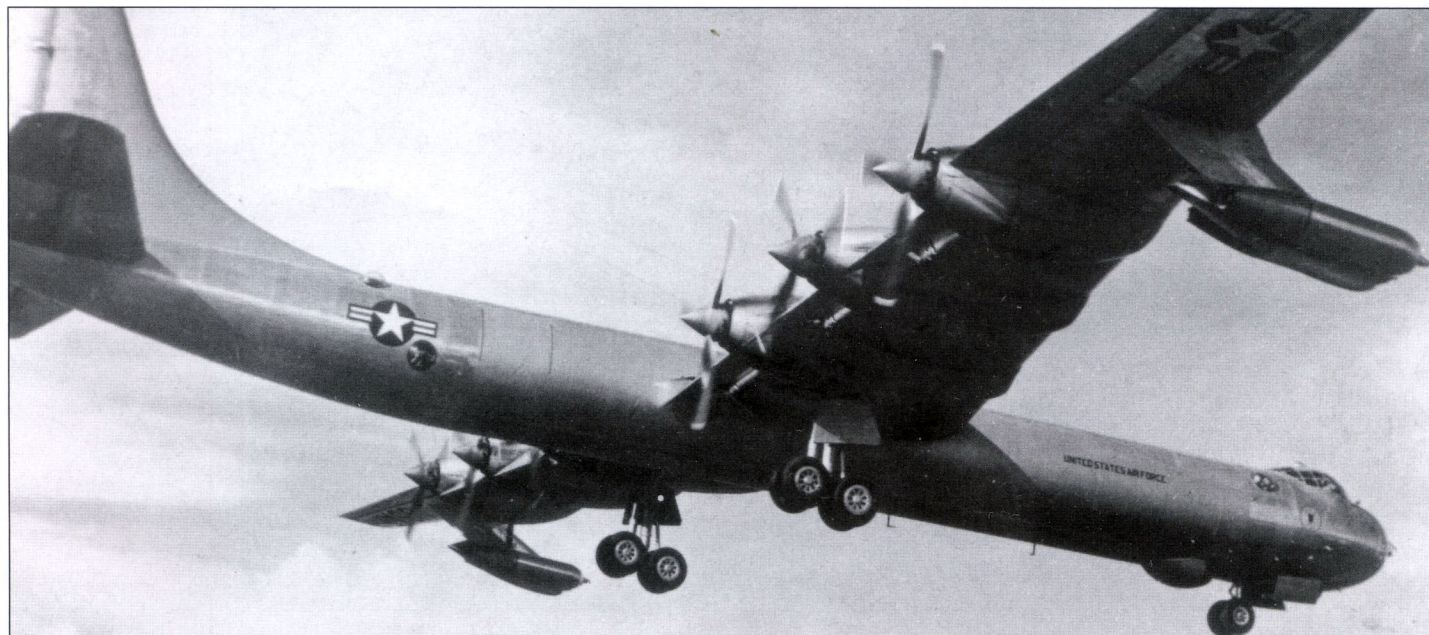
Consolidated had already commenced work on the two aircraft when the Japanese attack on Pearl Harbor shifted priority to B-24 Liberator production and the B-32 Dominator development. However, a 1/26th scale wind tunnel mock-up of the fuselage and half of the wing and twin tail was built in San Diego, then moved by rail in August 1942 to a new government plant in Fort Worth, Texas. The basic design provided for six Pratt & Whitney R-4360 Wasp Majors mounted to 19ft three-bladed Curtiss propellers behind the wing trailing edge. The 28-cylinder Wasp Majors had two turbo-superchargers to maintain 3,000hp up to 35,000ft. The pusher arrangement kept the propellers from interfering with the airflow over the wing. Six wing-mounted internal fuel tanks provided a capacity of 21,116US gal. with a self-sealing rubber coating protecting the four primary tanks. The wing was of a span of 230ft with a total area of 4,772 sq. ft. The fuselage retained the pressurised circular section first

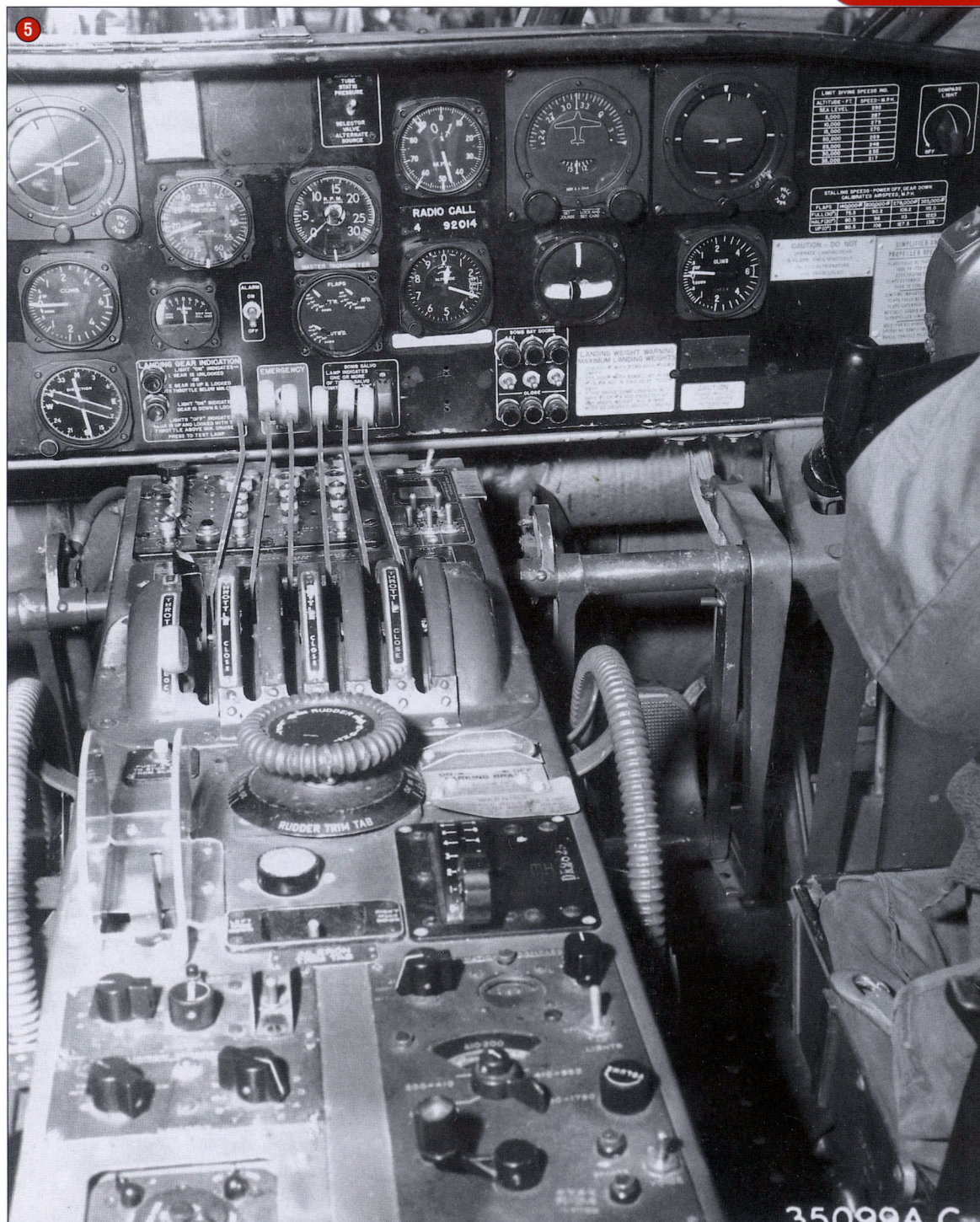
developed on the B-29 Superfortress and was 163ft in length; one benefit of a circular cross-section was that it eased movement throughout the aircraft for the crew. Between the forward section containing the flight crew and the rear gunner's position were the four bomb bays. To allow the crew to transfer between the fore and aft sections of the bomber was an 85ft long, 25 inch diameter tube positioned above the bomb bays. Movement along the tube was via a cart mounted on rails, this design was similar to that first used on the Superfortress. The B-36 development programme changed little to that first proposed, however, there were to be two significant modifications to the airframe prior to the bomber entering front-line service. The most noticeable change took place in the tail section. Originally this was a twin-rudder arrangement, like the B-24 Liberator, but in the autumn of 1943 a single fin arrangement was adopted as being able to cope with the increased stress on the airframe.

Defensive armament for the B-36 was still to be turreted guns, as had been used throughout the war on USAAF bombers, the B-36 would have a total of four power operated retractable turrets and a remote-controlled tail turret giving a total of fifteen guns. The top forward gunner was positioned in a turret with two 37mm guns, while another similar turret could be lowered from a bay positioned underneath. Four 0.50 calibre guns were mounted in a rear upper turret, which was remotely-controlled by gunners

The fuel and oil support vehicles that are required to keep the B-36 Peacemaker fully loaded with 21,116 gal of fuel and 1,200 gal of oil are pictured in front of B-36B at Carswell AFB, Fort Worth

A Peacemaker seen on finals whilst on deployment to a 'tropical air base' during a world-wide SAC exercise in the early fifties

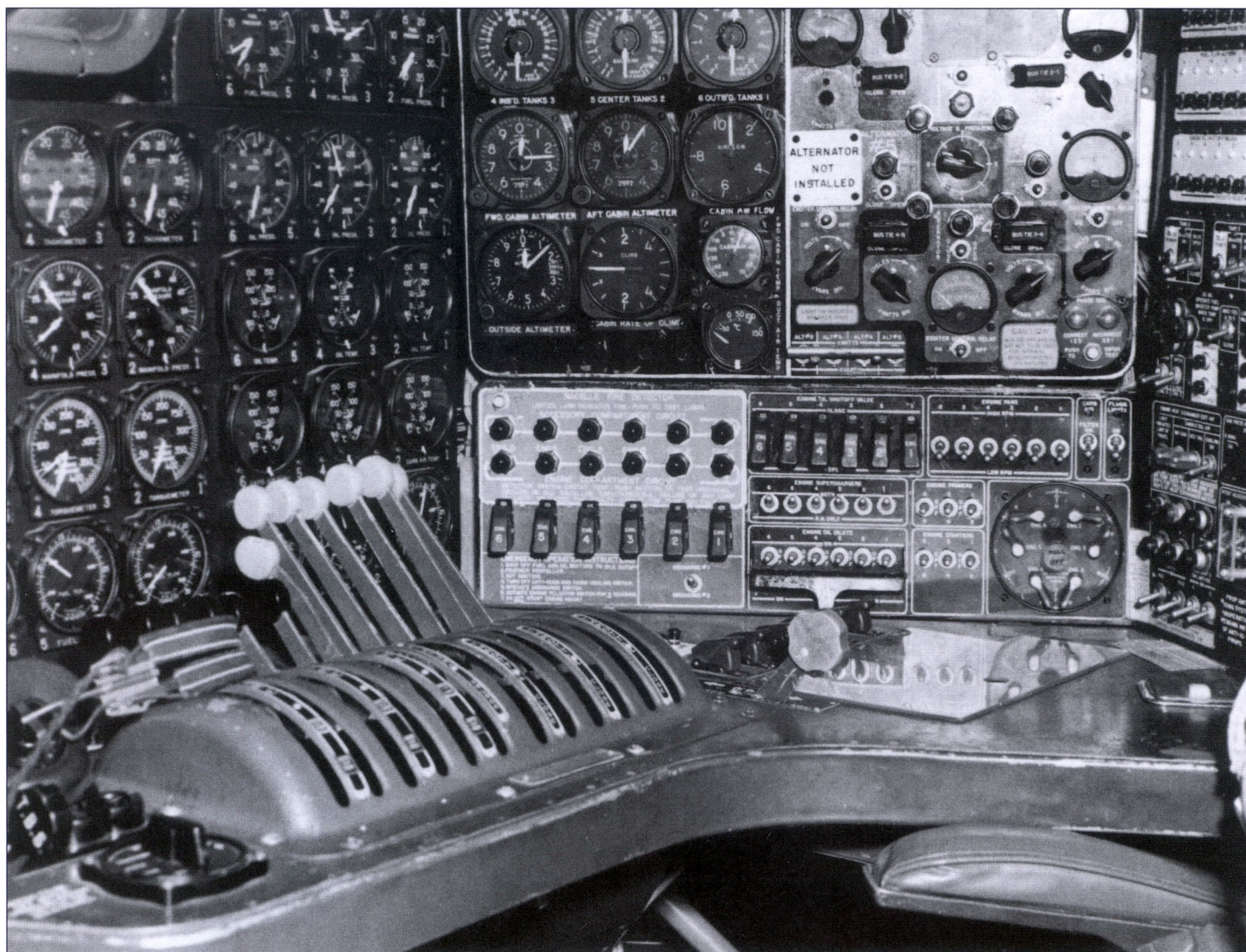




5. The pilot's instrument panel on what was, at the time, the world's largest land-based bomber. Note the amount of warning information panels and the large number of throttle levers

6. With 'six turning and four burning' a B-36B-10 lifts off. This particular Peacemaker is a modified B-model with twin jet pods identical to those carried on Boeing's XB-47 Stratojet, even down to the J-35s until J-47s became available. The prototype's first flight was in March 1949. Note the absence of bracing struts on the jet pods. This aircraft along with the 15 others in its Block number were all later up-graded to D-models





sighting from blisters in the rear of the fuselage. A similar retractable turret was mounted in the lower fuselage, while radar aiming was provided for the tail turret equipped with one 37mm and two 0.50 calibre guns.

With the specifications finalised by June 1943, the proposed bomber was to be the heaviest ever built. With an empty weight of 127,643lb, and 265,512lb gross weight when carrying eleven crew, twenty 500lb bombs, and 18,881US gal. of fuel required for a typical mission of a total range of 10,000 miles. Bomb load for a shorter mission was estimated to be seventy-two x 1,000lb which could be carried 4,620 miles. The performance of the XB-36 at this weight was 280mph at sea level and 369mph at 30,000ft, although a cruising speed of 245mph and a service ceiling of 40,000ft was adhered to by bomber crews. However, these figures were to be downgraded as the XB-36 developed, additional equipment and modifications increased the overall weight of the aircraft to significantly affect its performance, a problem that would only be resolved with later models. While Convair (an amalgamation between Consolidated and Vultee Aircraft) continued with their design unabated, enthusiasm for the B-36 project fluctuated in accordance with events in Europe. Initially, B-24 Liberator production siphoned off experience personnel and priorities. By September 1942, General 'Hap' Arnold ordered the 'highest priority' to both the XB-35 and XB-36 because the Japanese successes made more likely the need for bombers that were capable of flying the whole Pacific Ocean. Responding to Convair's complaints to the Secretary of War, that it was difficult to get sub-contractors for an order for only two aircraft, a 'letter of intent' for 100 B-36s

was issued on July 23rd 1943. However, it would be almost a year before the contract was signed and the war would end before the B-36 became a high priority project.

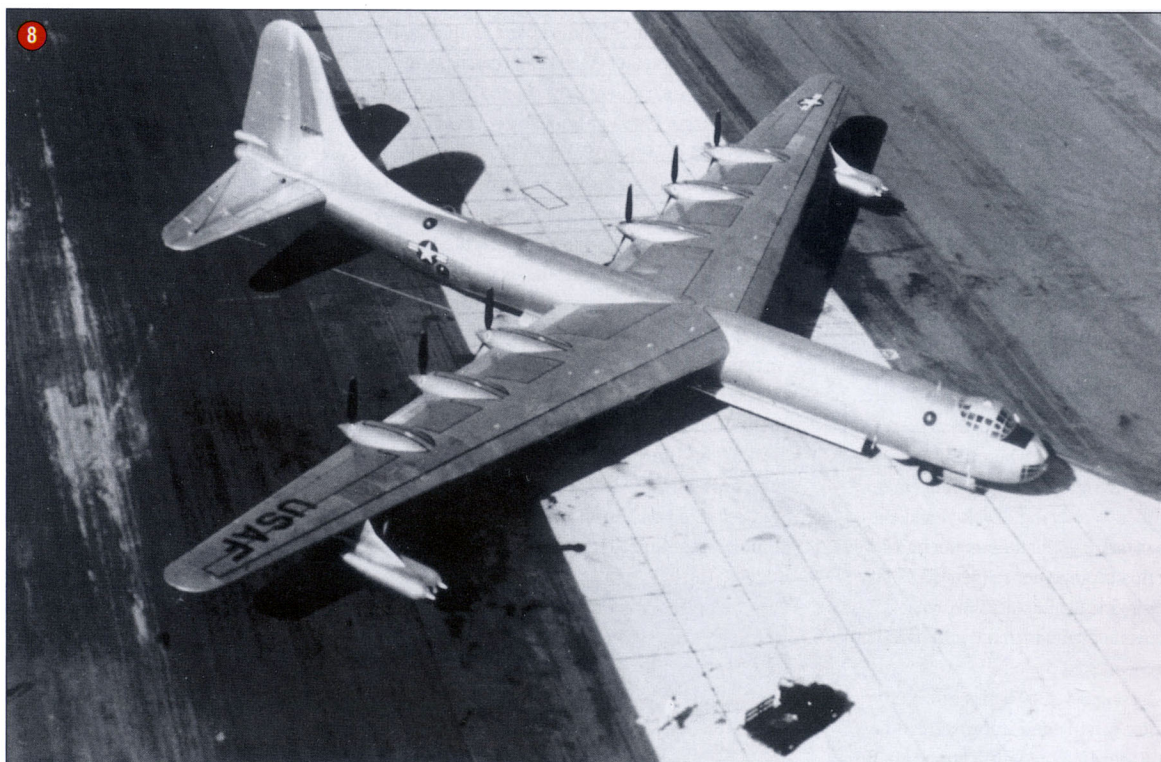
While the Japanese surrender saw the suspension and cancellation of many aircraft contracts, the end of the war had the opposite effect on the B-36 programme. The appearance of the atomic bomb, as well as the cost in lives of capturing island bases for the shorter-ranged B-29s, convinced the Air Force that it needed a truly intercontinental bomber within its arsenal. Cancellation of the B-32 programme on August 15th 1945, finally gave the go-ahead for Convair to place its full resources behind the development of the B-36.

It was to be six days after VJ-Day, September 8th 1945, that the XB-36, 42-13570, was wheeled out of Convair's Experimental Hangar. Engines arrived one at a time along with other final components and on June 12th 1946, the first engine test runs were conducted. During one of these tests, the wing flaps disintegrated in the propeller turbulence. The fabric-covered magnesium alloy flaps had to be replaced by stronger ones of aluminium, some six times heavier, thus causing further delays to the programme. Taxi tests began on July 21st, and on the August 8th 1946, the XB-36 was ready for its first flight, some five years after it was ordered. The aircraft now weighed 200,000lb with 8,000US gal. of fuel, and nine crew, including pilot Beryl A. Erickson with co-pilot Gus Green. The XB-36 lifted off for the first time at 10.10am for a very carefully flown 36 minute flight, during which the undercarriage remained down. The event was watched, with immense pride, by Convair's seven thousand employees.

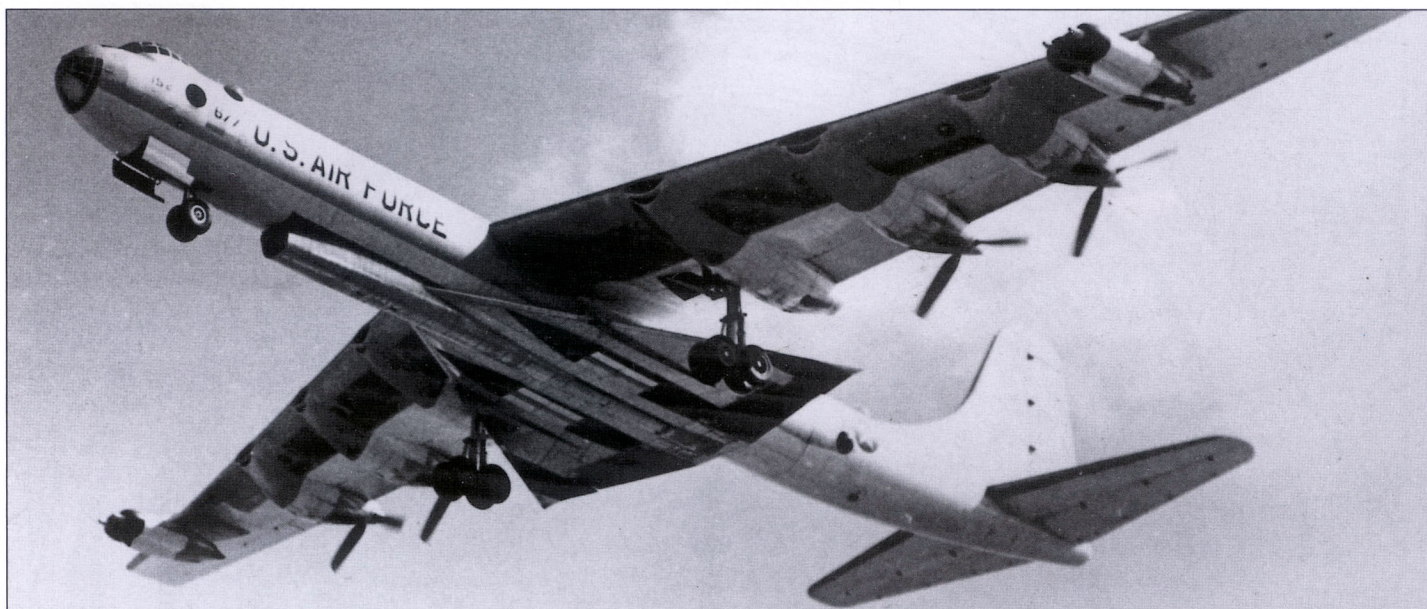
The Flight Engineer's control panel showing the duplicate six displays, one for each engine



7. The sheer size of the Peacemaker saw to it that crew members had to ride a miniature scooter through an 85ft tunnel over the bomb-bays to reach the fore and aft sections



8. The largest bomber ever to serve with the USAF, the B-36 Peacemaker earned the nickname of 'America's Big Stick'. From this view it is clear why



This and further flight tests soon showed that there were a number of mechanical and technical problems that needed to be resolved with the XB-36 before the bomber could enter front-line service with SAC. Due to the aircraft's unique size and design the XB-36 was regarded as 'state-of-the-art' and pushed the very frontiers of aeronautical engineering. An example of this was the engines. The engine cooling system was inadequate, and although the prototype reached 37,000ft it was unable to maintain high-altitude flight until a better cooling fan could be developed. Propeller vibration seriously punished the wing and the engine structure and many sections had to be strengthened. On one occasion a propeller broke loose at 10,000ft and in another incident all three engines stopped on one side because of a vibration induced failure of the electrical system in the wing.

The XB-36 was unarmed. However, the Air Force was still wrangling over the type of armament to fit to the bomber and numerous proposals for the guns to be installed in the turrets were discussed, many proving to be impractical. Eventually the final configuration consisted of sixteen, 20mm guns in eight remotely-controlled turrets, one of them in the nose. The addition of a turret in the nose required a re-design of the flight deck, which saw the replacement of the flush canopy with that of a bubble type design which greatly increased visibility for the pilot, co-pilot and flight engineer. A full-scale mock-up of the cabin had been built in June 1945 and a number of Air Force crews were invited to Convair for their opinions; this bubble-type canopy was to become standard on all production B-36s. Another unique feature of the prototype was the large single main wheels, some 110 inches in diameter, at the time they were the largest ever made for an aircraft. However they required a runway that was 22.5 inches thick, so limiting the prototype to only three specially strengthened runways; at Fort Worth, Eglin Air Force Base and Fairfield-Suisun (later named Travis AFB). The reason for using such large single wheels was that when the XB-36 was first proposed adequate brakes for a multi-wheel arrangement did not exist, although a number were being developed at the time. At last, a four-wheel gear using 56 inch diameter tyres was perfected for the B-36A. For this arrangement only a 13.5 inch thick runway was needed, this made available 22 primary runways and a further 22 alternate airfields that could handle the production bombers.

The first production B-36A-1-CF, 44-92004, was flown on August 28th, 1947, with the new canopy and improved landing gear. The 'CF' suffix denoted Convair Fort Worth; since all of the B-36s produced were to be assembled at Fort Worth this was later

dropped from the designation. The first production B-36 received the 'buzz number' BM-004 on its fuselage sides. The B-36A-1 was flown to Wright Field on August 30th by Major Stephen P. Dillon, the first Air Force officer to qualify as a B-36 pilot. Only the equipment needed for the delivery flight was installed within the bomber, as it flew before the second prototype, designated the YB-36. The B-36A-1 would fly only once, the aircraft was gradually demolished at Wright Field in static and dynamic tests of its structure.

The second prototype, YB-36, 42-13571, Air Force buzz-number BM-571, was moved to Convair's Experimental Hangar in April 1947, and incorporated safety and engineering changes indicated by experiences with the XB-36. Some of these changes included the introduction of more efficient turbo-superchargers and the improved canopy, although the single-wheel undercarriage remained. Test pilot for the first flight on December 4th 1947, was once again Beryl Erickson.

With the flight of the YB-36 the first aircraft, XB-36 was returned to the Convair production line for modernisation, having flown some 89 hours over 31 flights. It was now to be fitted with a four-wheeled undercarriage, new engines, rearranged instruments and some fuselage re-skinning. Flying again in June 1948, with the 'buzz number' BM-570, the XB-36 was ferried to Wright Field on the June 19th, for acceptance by the USAF. It was returned to Fort Worth for use in training but spent most of its time parked with little to do. At one time the USAF gave consideration to modifying the prototype to production standards, but the expense and, with B-36As now leaving the production line, the conversion was deemed pointless. The prototype was to end its days in May 1957 as a derelict airframe used by fire-fighters.

It was not until June 1948 that the first four B-36As were delivered to the USAF; BM-006 on June 2nd, followed by BM-007 on June 18th to Eglin AFB for tactical tests and ground crew familiarisation. BM-015 followed on June 26th and BM-017 was delivered on June 30th, these were the first B-36s to join Strategic Air Command (SAC). Six more arrived in July to be

One of the best known missions of the Peacemaker was when a B-36F was tasked with flying the prototype fuselage of the Convair B-58 Hustler from Carswell AFB to Wright-Patterson AFB, on March 12th, 1957. To allow the supersonic bomber to fit underneath, the inner propellers were removed from the Peacemaker

A colourful B-36B, 44-92028 of the 7th Bomb Group (Heavy) is seen at Carswell AFB in mid-1949. The bomber is undergoing engine tests prior to a demonstration flight for senior SAC officers





The first aircraft to carry an operating nuclear reactor in flight resulted in Convair's NB-36H 'Crusader'. First flown in September 1955, the programme was eventually cancelled when the USAF saw no future in nuclear powered aircraft

A mixed formation of B-36A and B-36B Peacemakers low over the US countryside having completed a long-range navigation exercise



followed by five more during August 1948. The Air Force crews were keen to exploit the capabilities of their 'giant' bomber. One early example of this was on May 13-15th when B-36, BM-013, was flown from Fort Worth to Hawaii and back.

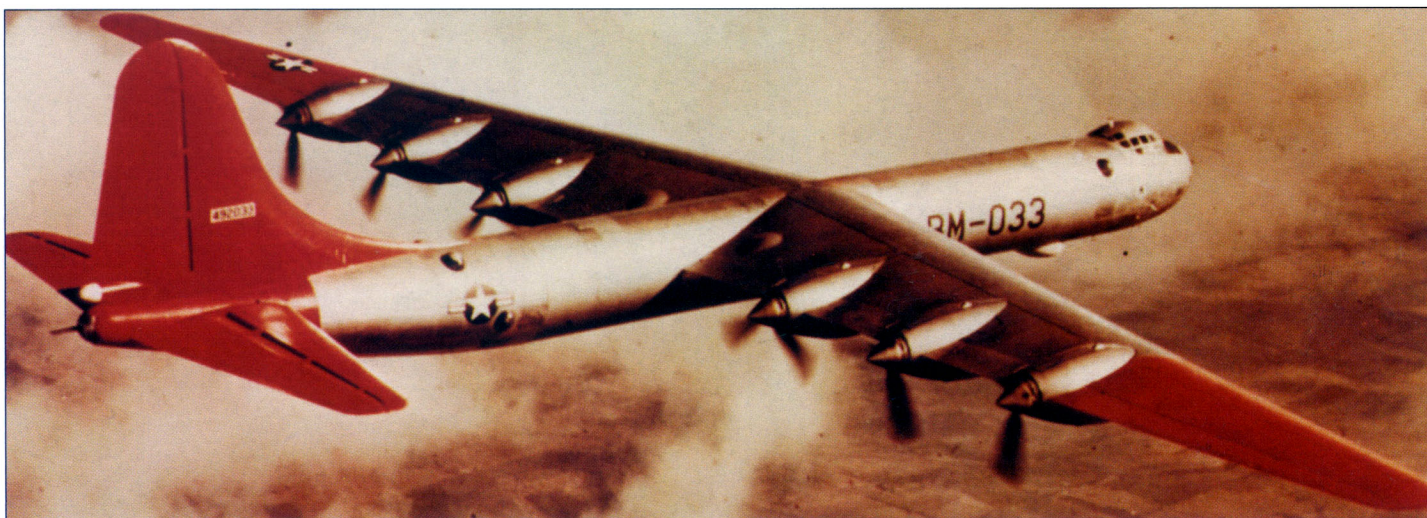
With enough bombers coming off the production line it was time for the USAF to establish its first Peacemaker operational unit. The first SAC unit to be equipped with the B-36 was the 7th Bomb Group (Heavy) at Carswell AFB. The location of the unit, simply across the runway from Convair's Fort Worth plant was deemed extremely advantageous as any problems occurring at Wing level could be discussed with Convair representatives that were a mere 5 minute drive away. By November 1948, 22 B-36As, serialised 44-92026 to 44-92098, had been completed each having a gross weight of 310,380lb when loaded with 24,121 US gal. of fuel and a 10,000lb bomb load. The bombers required a take-off run of 8,000ft, and had a tactical range of 8,000 miles. If a full bomb load of 72,000lb was carried this allowed for a tactical radius of 2,100 miles, and a full fuel load of 26,745 US gal. allowed for a ferry range of 9,136 miles without bombs. However soon after these statistics were released the Air Force

performance classifications were changed to ease confusion amongst manufacturers. Performance was now classified by a new method in which speed and altitude were measured not at gross, but at 'combat weight', the point at which the bomber is approaching the target with most of its fuel consumed. In the Peacemaker, this was beneficial as the combat weight dropped to 212,800lb. At these weights the B-36A had a top speed of 345mph at 31,600ft and a service ceiling of 39,100ft, this compared to the B-50A, delivered at the same time to the USAF, which had a speed of 391mph at 30,000ft. But its combat radius with 10,000lb was 1,700 miles shorter. Although the B-36A was equipped with the AN/APQ-23 Bombing-Navigation Radar, no guns were installed and the types function with the 7th Bomb Group was purely to serve as a trainer prior to the introduction of improved variants of the B-36. After twenty-two, B-36As had been completed, Convair shifted production to the B-36B delivering 73 examples, 44-92026 to 44-92098.

For the B-36B improved powerplants were introduced, this time being R-4360-41 Wasp Majors, rated at 3,500hp which now made possible a top speed of 381mph at a service ceiling of 42,500ft at combat weight. An AN/APQ-24 Bombing Navigation Radar and AN/APG-3 Gun-Laying Radar in the tail were carried, and the bomb bay could accommodate two 43,000lb 'Grand Slam' bombs.

By the winter of 1948, SAC had thirty-five B-36Bs at Carswell, and the Bomb Wing wasted no time in demonstrating their long-reach ability. On December 7th 1948 a B-36B commanded by Major John D. Bartlett flew from Carswell AFB to Hawaii, dropped a dummy 10,000lb bomb in the ocean, passed over Honolulu at night and returned to Carswell. The 8,100 mile trip lasted 35 ½ hours and aroused much comment with its undetected approach against Pearl Harbor on the anniversary of the Japanese attack; none of the local defences were even aware of the bomber's presence. Despite the uproar that followed the practice mission, SAC continued to increase the ranks of its B-36s with a second unit, the 11th Bomb Group (Heavy) quickly became operational at Carswell.

As the prospect of large scale production of the B-36 steadily increased, Convair, prior to the introduction of the A and B variants, continued to propose and develop other specialised models of Peacemaker. The B-36C was intended to increase the speed of the bomber over the target area by the use of Pratt & Whitney's development of a Variable Discharge Turbine (VDT)



version of the R-4360 powerplant. In early 1947, Convair anticipated that a similarly powered B-36 could be expected to reach 410mph and have a service ceiling of 45,000ft. The new engine's configuration however would require changing the pusher-type arrangement to a more conventional layout. The engines would have to be reversed, meaning the propeller shafts had to extend ten feet to clear the leading edge of the wing. Approval for the prototype conversion was agreed on July 10th 1947. In September of that year Convair proposed that 34 aircraft be built with VDT engines as the B-36C-1, with the additional expense being met by reducing the then total B-36 contract to 95 aircraft. This plan received the approval of a majority of the Air Force Generals, except General Kenney, and was directed to proceed on December 4th by the Air Material Command (AMC).

By April 1948, however the VDT programme had run into difficulties. Gradually it became clear that the B-36C would be slower than the B-model. AMC was now keen to cancel the project as soon as possible. The whole B-36 programme hung in the balance while SAC had yet to receive its first B-36As. In the event the B-36C was cancelled and the contract was resumed for all 95 Peacemakers to be built.

By the time of the first flight of the 54th B-36, 44-92057, off the line it was becoming clear that the bomber required more power to attain the speeds and altitudes required within SAC units. The improvements came with the adoption of the Pratt & Whitney R-4360-25 which had been suitably refined and improved. But a further increase in power was still required and so in March 1949, a converted B-36B was flown with a pair of J-35-A-19 jet pods slung underneath each wing, outboard of the piston engines. Making its first flight with the pods on March 26th, the test soon revealed vibration problems with the arrangement which were resolved by adding bracing struts to the units and the prototype B-36B demonstrated a speed of 400mph at 35,280ft and reached an altitude of 40,000ft. However, this had only been a trial flight and the prototype was returned to Fort Worth for installation of the definitive jet pods, the General Electric's J-47 turbojets capable of providing 5,200lb of thrust each. The bomber flew with the new J-47 pods on the July 11th 1949. Such were the improvements in performance that the Air Force decided to convert 64 B-36Bs and build 22 more Peacemakers to B-36D standards. The D-model could be easily identified in many cases by its white painted undersides, in order to reflect the heat from a nuclear blast and could also be identified by its faster opening bomb bay doors.

The B-36D had a crew of fifteen; commander, two pilots, two engineers, navigator, bombardier, two radio operators, and an observer, (the first radio man handling ECM while the second radio man, co-pilot and observer aimed the three forward

turrets). The rear compartment accommodated five gunners, including one for the AN/APG-3 (later AN/APG-32) radar controlling tail turret. A K-1A Bombing Navigation System weighing 1,700lb, including radar and optical equipment for blind or visual bombing by a single crew member, was carried. It was claimed that this system permitted bombing at night with greater accuracy than former daylight methods at lower altitudes. During later modernisation programs, the K-1A was replaced by a K-3A system, along with a host of other improvements to the electronic suite.

At the time policy makers and senior officers in the USAF still believed in numbers over any potential enemy and with newer model Peacemakers entering service there was a reluctance to get rid of the older B-36A models and as it happened a new role for these superseded variants was soon found, that of reconnaissance. A number of unarmed B-36As were converted to RB-36E standards to serve alongside a number of newly built RB-36Ds. Instead of bombs in the forward bay, fourteen cameras, including one with a 48-inch focal length lens were installed. The first RB-36 was flown on December 18th 1949, without jet pods. After early tests, jet pods were installed and a demonstration flight was performed in front of President Truman at Eglin AFB, on April 22nd 1950.

The first RB-36D was accepted by SAC on June 3rd, 1950, months before the bomber version was to enter service and commenced operational service with the 28th Strategic Reconnaissance Group at Rapid City AFB, South Dakota (later renamed Ellsworth AFB). After seven RB-36Ds had been delivered, the last four aircraft on the original 100 Peacemaker contract (44-92095 to 44-92098) were completed as B-36D bombers. The first B-36D was delivered to Eglin AFB on August 19th 1950. Deliveries on the second production contract in 1949, beginning with 49-2647, included 22 B-36Ds and 24 RB-36Ds interspersed on the production line. The last B-35D-35 was completed in June 1951.

With the completion of the bomber order Convair undertook the conversion of 21 of the B-36A plus the YB-36 to RB-36E standard on February 28th 1949. The first RB-36E flew on July 7th 1950. The last of the 22 RB-36E was delivered on 20 July 1951.

The change in role for the Peacemaker to reconnaissance saw numerous changes within the fuselage along with the crew complement. For example, the RB-36D was now equipped with fourteen cameras weighing 3,309lb in the forward bay, while the second bay contained up to eighty T86 flash bombs. The third bay could accommodate an extra 3,000 gallon fuel tank and the fourth bay housed ECM equipment. Standard gun armament was carried along with an AN/APQ-24 radar-navigational system

Wearing red tail surfaces and wing-tips associated with Arctic tests this early model B-36B-1 gives just an indication of the immense wingspan of the Peacemaker. Note the single white radar of the AN/APG-3 tail turret



Taken from his wingman this Peacemaker seen at a rather low altitude, illustrates the differing metal tones on the wing's upper surfaces and the black safety walk markings

to locate targets. The crew originally consisted of eighteen; two pilots, engineer, photo-navigator, radar navigator, weather observer, radio-ECM operator, photographer technician, three ECM operators, tail gunner, and six relief crew gunners. Such a number of crew required several intercom channels throughout the bomber. Performance of the RB-36s nearly matched that of the bomber versions, and they were able to reach 408mph. During one test by Convair pilot B.A. Erickson, an RB-36 flew for 51 hours and 20 minutes on a non-stop, unrefuelled endurance trial that began on January 14th 1951.

In 1951, SAC underwent a reorganisation from that of Groups to Combat Wings. The 7th and 11th Heavy Bomb Wings at Carswell were 8th Air Force units marked with triangle codes, while the 92nd Bomb Wing at Fairchild AFB, which received its first B-36 on July 29th 1951, was marked with the circle tail code denoting 15th Air Force. The 28th Reconnaissance Wing at Rapid City AFB received their first B-36B on July 13th 1949, and had 15 by April 1950, these served as trainers prior to the arrival of RB-36Ds in June.

As SAC's use of the B-36 expanded, Convair at times were hard press to keep up with demand but, a new version of the Wasp Major gave rise to another Peacemaker variant, the B-36F with greater speed and climb.

The new powerplants were first installed on B-36 number 109, which flew on November 11th 1950, and was later delivered to SAC as B-36F-1, 49-2669. This change in powerplant was now to become standard on all following models. A further change undertaken on Peacemaker, number 134, 49-2270, was the installation of the K-3A radar system and the APG-32 gun laying radar were now standard, as mentioned earlier, and the first example to leave the production line equipped with all of these changes was B-36F-10, 50-1064 in April 1950. In addition a chaff dispenser was installed to confuse enemy radar.

Later model Peacemakers were now able to reach a top speed of 417mph and had a service ceiling of 44,000ft, with a standard bomb load and a combat weight of 264,300lb. Thirty-four B-36Fs

were delivered from May to November 1951, although interspersed among these were twenty-four RB-36Fs. The latter variant now had a total crew of twenty-two, which saw the manning of the fourteen cameras, and also saw a reduction in top speed to 409mph.

Still not happy with the Peacemaker, SAC sought for ever improved models, and on April 5th 1952, the first of what was to be the most important variant, the B-36H, flew for the first time. Differing little externally from the B-36F, the 'H' model was equipped with a revised flight deck, with a station for a second flight engineer. By far the greatest improvement was in the bombing system. Under the project name Blue Square, the relocation of the K-system to a pressurised compartment allowed for inflight maintenance and greater accuracy during the bomb drop. The B-36H could now reach a top speed of 416mph and had a ceiling of 44,000ft. Eighty-three bomber variants and seventy-three RB-36Hs were delivered from May 1952 to July 1953. They could easily be distinguished from earlier models by the twin radomes of the AN/APG-41A tail gun system.

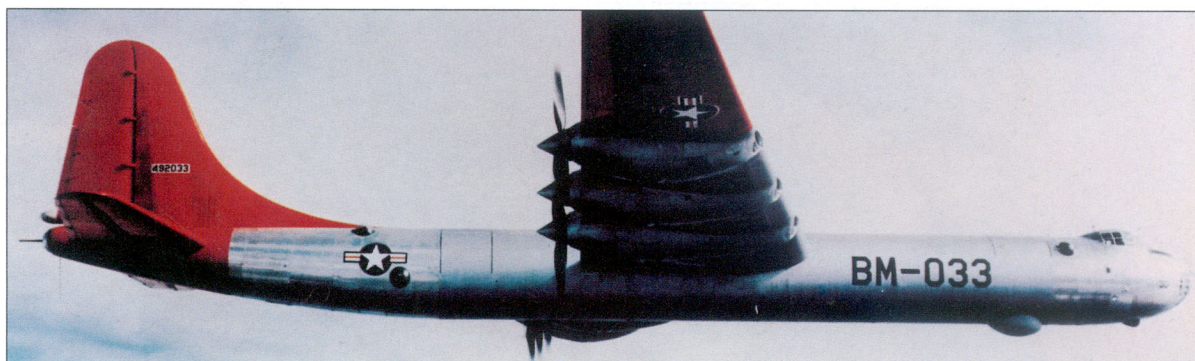
However the final Peacemakers off the production line were to change model one last time, to that of the B-36J. This saw the introduction of an additional 2,770 gal of fuel in the outer wing panels, so increasing the overall weight of the aircraft to 410,000lb while the top speed at a combat weight of 171,035lb was 411mph. The first J-model was flown on September 3rd 1953 and deliveries commenced the following month.

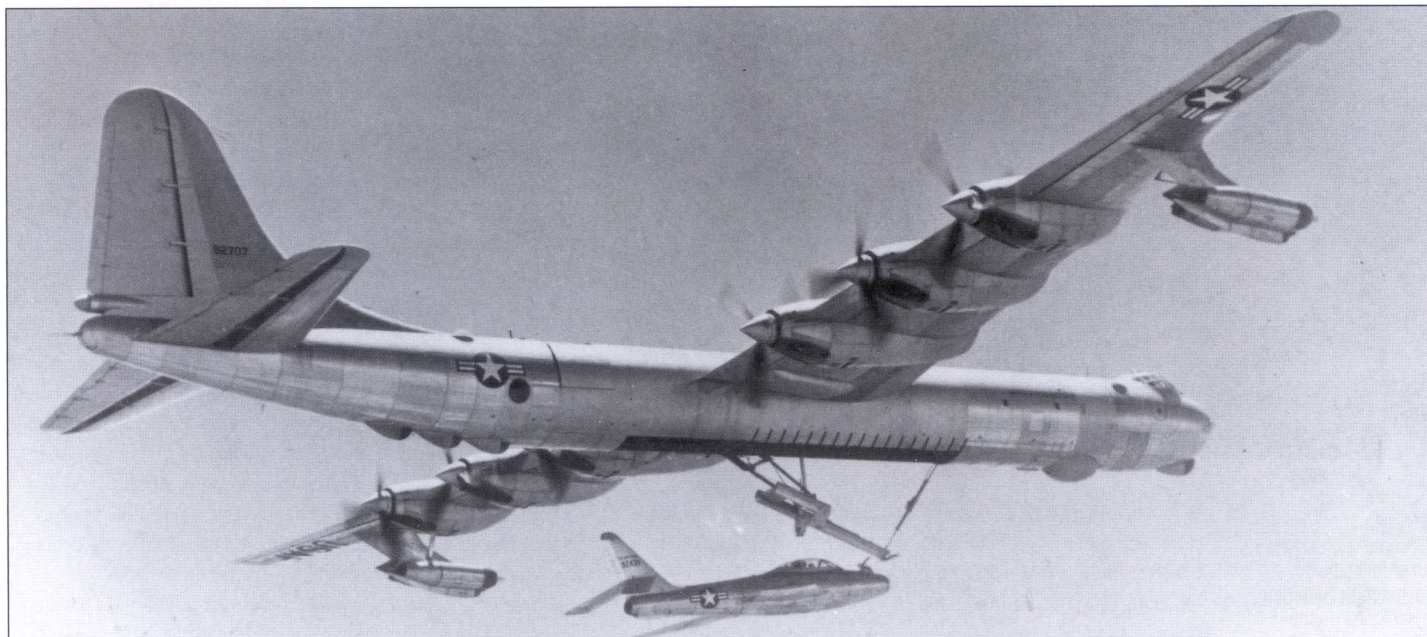
But, the ever increasing weight of the Peacemakers and the loss in performance on some variants was of some concern to the senior ranks within SAC and an inquiry resulted in the implementation of Project Featherweight, which was a program to reduce the overall empty weight of the bombers to increase range, altitude and speed. Class II Featherweights kept all their guns, but the aircraft designated Class III had all their gun turrets and fire control radar removed except for the tail guns. The final fourteen B-36s were finished as B-36J (III) carrying a crew of thirteen, two guns and replacing the gunner's blisters with small flush windows. First delivered in February 1954, the new variant now had a combat range of almost 4,000 miles, a top speed of 418mph at 37,500ft and a service ceiling of 43,600ft. Featherweight conversions were also made to some of the older B-36s within SAC inventory between February and December 1954.

The Fort Worth plant delivered the final Peacemaker, a B-36J (III) on August 14th 1954. A total of 383 of the bombers had been delivered, including two prototypes. The average cost for each bomber was \$3,776,000.

At the height of Peacemaker operations, SAC had ten Wings with a total of 209 B-36 and 133 RB-36 in service along with twenty-four Medium Bombardment and five Medium Reconnaissance Wings with 795 B-47, RB-47s, 78 B-50 and 12 RB-50 aircraft. The medium aircraft all required aerial refuelling for long-range missions.

A B-36B Peacemaker illustrates the clean lines of its fuselage. The forward lower radome housed the AN/APQ-24 Bomb Navigation Radar. Later Peacemakers would be festooned with blisters and aerials on their airframes





During daily operations flying the B-36 was for many a unique experience. For officer pilots, navigators and bombardiers it was the opportunity to handle a huge aircraft whilst travelling in comfort and style. For enlisted personnel, in what would be the last bomber to having manned gun positions, it was the chance to earn flight pay. The flight deck for the B-36 commander, second pilot, and rearward facing engineer, was unlike anything they had experienced. There were three bunks in the aft cabin, at several points along the fuselage a man could stand up-right, something that crews were never able to do in the jet bombers that followed.

A more serious side to the Peacemaker's missions were incursions into Soviet airspace. In the days before SAM missiles, a Peacemaker crew could cruise at 50,000ft secure in the knowledge that they were beyond interception.

Throughout the practice missions of the Peacemaker, SAC had never forgotten the need for escort fighters for their massed bomber fleets. They had only to look back a few years to the war over Europe to see the losses incurred by the USAAF to Luftwaffe fighters. The immense size of the B-36 offered a solution to this problem – the bomber could take along its own escort fighter.

The initial proposal used the McDonnell XF-85 Goblin, which was first tested on August 23rd 1948. The stubby fighter was designed to fit in the bomb bay, but proved too unorthodox and difficult to be flown by service pilots.

SAC then turned their attention to mating their B-36 with a production fighter, a Republic F-84 under the FICON (fighter conveyor) project. The Peacemaker, now designated a GRB-36F,

was tested with the straight-wing F-84E Thunderjet, and the swept-wing F-84F Thunderstreak and RF-84K Thunderflash. As well as the escort role it was deemed that these jets would be able to undertake their own attack missions and photo-reconnaissance duties. Various methods were used to carry the fighters, including towing and wing-tip attachments and carrying the fighter in the bomb bay. However, the FICON trials went further than just being an experiment, and during 1955-56, B-36s were fully operational with their parasite fighters, before SAC turned their attention to inflight refuelling of its fighters.

A sole cargo version of the B-36 design was also produced as the XC-99, with the intention of capturing the civilian airline market. But only one example was ever built and was used solely by the USAF as a transport until 1957.

By 1955 the Boeing B-52 Stratofortress had begun to replace the B-36 Peacemaker, the B-52 had already beaten an all-jet development of the B-36 known as the YB-60 a few years earlier. SAC's last flying Peacemaker in service, B-36J-65, 52-2220, was also the last example built at the Fort Worth plant. Its final flight took place in February 1959 and the bomber was retired to the USAF Museum at Dayton, Ohio a few months later. By now SAC was an all-jet fleet with nearly 1,400 Boeing B-47 Stratojets and B-52s standing ready for war. Though never to fly into combat the Convair B-36 Peacemaker had affected the transition between the Second World War piston-engined combat aircraft and the new age of jet bombers and served through a time which had seen tense situations between the communist nations and the west that fortunately never broke out into war. For their operational lives SAC's B-36s had kept the 'peace.' **MAM**

The FICON programme was perhaps the most ambitious of all undertaken with the Peacemaker. Here the prototype GRB-36F extends its trapeze awaiting connection to the prototype YRF-84F



A surviving McDonnell XF-85 Goblin seen in the USAF Museum, Ohio. The small fighter proved to be too unorthodox to be flown by service pilots. (© Dave Chapman)



1. Sea Harrier F/A.2 shows off its lines
(©BAe Systems)

Sea Harrier F/A.2

by Andy Evans

One of the many consequences of the Falklands conflict of 1982 was the need to have a better-equipped Sea Harrier force. Thus in early December 1988 the MOD awarded BAe a contract to update all existing FRS.1s to a new FRS.2 standard, and in March 1990 announced an order for 10 new-build FRS.2s. It was later decided to change the designation of the aircraft to reflect its new capabilities. So out went the FRS - 'Fighter Reconnaissance Strike' derivation and in came the American sounding F/A - for 'Fighter Attack' Mk.2 the F/A.2.

The Sea Harrier F/A.2 is optimised for air-to-air combat and provides air defence for the carrier fleet, particularly against low-flying attack aircraft armed with long-range air-to-surface missiles, with secondary missions of surveillance, air-to-sea and air-to-ground attack. Unlike the AV8B+ and the GR.7, the F/A.2 is still very much a 'first generation' Harrier, with most of the aircraft being direct conversions from original FRS.1 airframes. However, many improvements to the original FRS.1 designation have been made, making it a very potent weapons platform.

Firepower

At the heart of the Sea Harrier F/A.2's abilities is its new radar, the Ferranti 'Blue Vixen' set, which is a multi-mode, track-while-scan Pulse Doppler set giving an all weather look-down shoot-down ability, together with the capability to engage multiple targets simultaneously. The radar also interfaces to the AMRAAM missile system. The new radar is housed in a re-styled bulbous nose radome, being larger and more rounded than that of the rather 'sharp' FRS.1, and the latter's above mounted pitot tube has been re-located on the leading edge of the tailfin - rather reminiscent of the P.1127 and over three generations earlier. The original F95 surveillance camera is retained in the nose of the aircraft, together with a cockpit voice recorder for surveillance mission evaluation.

The missile of choice is the Raytheon AIM-120B AMRAAM (Advanced Medium Range Air-to-Air Missile) which is an all-weather, fire-and-forget missile, equipped with an active radar seeker. When combined with the Blue Vixen set, it makes the new Sea Harrier one of the most potent combat aircraft in the world. The AIM-120s, are mounted on Frazer-Nash Common Rail Launchers, and fitting a further two AIM-120s on American LAU-106 launch rails in place of the under-fuselage gun packs. The aircraft has five weapon stations and stores are mounted on Frazer-Nash rail launchers, Raytheon LAU-106A ejection-launchers and Varo LAU-7 rail launchers. The F/A.2 is equipped with the AIM-120A AMRAAM medium-range air-to-air missile, with a range of over 50 miles. The AIM-9M/L Sidewinder air-to-air missile provides the Harrier with capability for firing close range at an approaching enemy aircraft in a dogfight. The Sea Harrier can also carry the ALARM anti-radar missiles, which can be deployed in direct attack mode, against a radar target, or in loiter mode, where the missile is launched in the vicinity of the threat and waits for the hostile radar to emit. The aircraft also carries a pair of 30mm ADEN gun packs under the fuselage, with 120 rounds per gun. Typical air combat loads would be two AIM-120 AMRAAM or four AIM-9 Sidewinders and two gun packs. The gun pods can be replaced with two additional AMRAAMs. The Sea Eagle anti-shipping missile was withdrawn from use in the Royal Navy in late 1999.



2

Structure and Systems

The fuselage was also lengthened by just under 14 inches to improve stability and provide space for the extra equipment. This was originally to be a 'plug' just behind the engine, however on new and upgraded aircraft a complete new rear fuselage has been fitted. On the wings the leading edge has been slightly altered - another small fence added and one of the

2. Carrying Aden gun packs
(©BAe Systems)

3. Ideal for its duties the F/A.2 carries both Sidewinder and AMRAAM
(©BAe Systems)



3



vortex generators removed, with wing hardpoints being beefed up to tote up to 1,000lb each. The aircraft has also retained its internally mounted F95 oblique reconnaissance camera together with a number of additional air scoops associated with cooling the new systems.

A modern 'office' for the pilot has been designed, with a new HUD, and two multi-function displays have been added - with the radar's presentation being sited mainly on the right MFD. HOTAS allows the pilot to select the radar, and weapons. The FRS.1's ARI 18223 RWR has been replaced in the F/A.2 by the BAe Systems Sky Guardian 200, and the addition of a microwave airborne digital guidance equipment (MADGE) transponder, and the AN/ALE-40 chaff and flare dispenser. The AN/ALE-40 is capable of launching chaff, flares and active expendable GEN-X radar decoys. Also fitted is an IPG-100F global positioning system, an AD120 VHF radio, an AN/ARC-164 ARC radio and the AN/APX-100 Mk 12 IFF. The cockpit is further equipped with a Martin-Baker Mk 10H ejection seat.

The F/A.2's powerplant is the single turbofan Rolls-Royce Pegasus Mark 104 or Mark 106. However the aircraft may be upgraded with Pegasus 11-61 engines, already fitted to the Harrier II Plus and being retrofitted to some RAF GR.7 Harriers. The new engines would provide more thrust, particularly in hot climates.

Into Service

BAe began to convert the FRS.1 airframes to FRS.2 standard in the early part of 1991, and the first aircraft completed, ZE695, was handed back to the Royal Navy in April 1993. To bring the aircraft to squadron service an Operational Evaluation Unit was

formed at Boscombe Down on the 1st of June 1993 as an off-shoot of No.899 Squadron, and received its first aircraft, ZE695 and ZD616, in the August with the aircraft carrying the 'Winged Fist' tail motif with small white 'OEU' lettering on top of the tailfin. The OEU will remain an integral part of the squadron as long as the F/A.2 remains in service. No.899 Squadron itself took on charge its first FRS.2, ZA176, later that same month. Anxious to get the aircraft out to one of the

4. Range can be extended by the IFR probe
(©BAe Systems)

5. The UK carrier's compact lines mean there is little room for error on deck
(©BAe Systems)





6



7

6. ZH813, the very last UK Harrier ever built
(©BAe Systems)

7. Scene on deck during recovery
(©BAe Systems)

8. 899 Squadron aircraft have tanks fitted
(©BAe Systems)



8



carriers for extended sea trials, four newly designated 'F/A.2s' joined HMS Invincible on an Adriatic 'cruise', working with the No.800 Squadrons Sea Harrier FRS.1s - these being: ZD612, ZD615, ZE696 and ZE697, all from No.899 Squadron OEU.

The Royal Navy's first fully operational F/A.2 Squadron was No.801 which received its first two aircraft, ZA176 and XZ455, on the 5th of October 1994 and the unit replaced No.800 Squadrons FRS.1s aboard HMS Illustrious off the coast of Italy, where they gave support to Operation 'Sharp Guard'. Flying a dual role, the aircraft were armed with a single 1,000lb bomb on the centerline and two AIM-120Bs on the outboard wing stations together with ADEN cannons and the internal F.95 recce camera. On its return to RNAS Yeovilton No.800 Squadron retired its FRS.1s and their first F/A.2 joined the unit on March the 17th 1995. The first totally 'new build' F/A.2 was delivered in October 1995.

HMS Illustrious, with seven aircraft from No.801 NAS embarked, left Portsmouth on January 17th 1997 bound for the



9. The Harrier's ancestry is obvious from this shot

10. 899's Senior Pilot (SPL0T) Dave Baddams prepares to fly.

11. Pretty viscious looking sharkmouth!



Persian Gulf. On March 7th 1997 five F/A.2s, each armed with a pair of AIM-120 AMRAAM missiles launched from HMS Illustrious in the Gulf to undertake the first Royal Navy air defence missions in support of Operation Southern Watch over Iraq. Daily operations were flown until March 12th, providing top cover for allied reconnaissance aircraft. In mid-November 1997 HMS Invincible with Nos 800 (eight F/A.2s) and 1(F) (six GR.7s) squadrons embarked headed for the Gulf in response to the latest Iraqi brinkmanship. HMS Illustrious, with No.801 Squadron's Sea Harriers and RAF Harrier GR.7s embarked headed for Oman to take part in exercise 'Saif Sareea II' a major UK-Omani exercise which started on September 15th. The Sea Harriers embarked were believed to be XZ497/001, XZ499/003, ZE690/005, ZE694/004, ZH797/002, ZH801/006 and ZH813/000

It was announced in February 1999 that RAF Harrier GR.7 and Royal Navy Sea Harrier F/A.2 squadrons were to be merged into a single unit called Joint Force Harrier from April 2000. The aircraft themselves will be based at RAF Cottesmore for the front-line units and RAF Wittering for the two training squadrons. The aim of this change is to create a unique joint force, capable of reaching trouble spots quickly, and deploying effectively once there. [MAM](#)



12. The rear fuselage 'plug' added to converted aircraft.

13. Good diorama ideas here

14. Dark Sea Grey adorns this 899 bird, note the radome contours

15. Airbrake detail

16. Strike camera

17. Vents at the tail

18. Outrigger detail

19. Note the radome contours





20. Nosewheel and Doppler detail

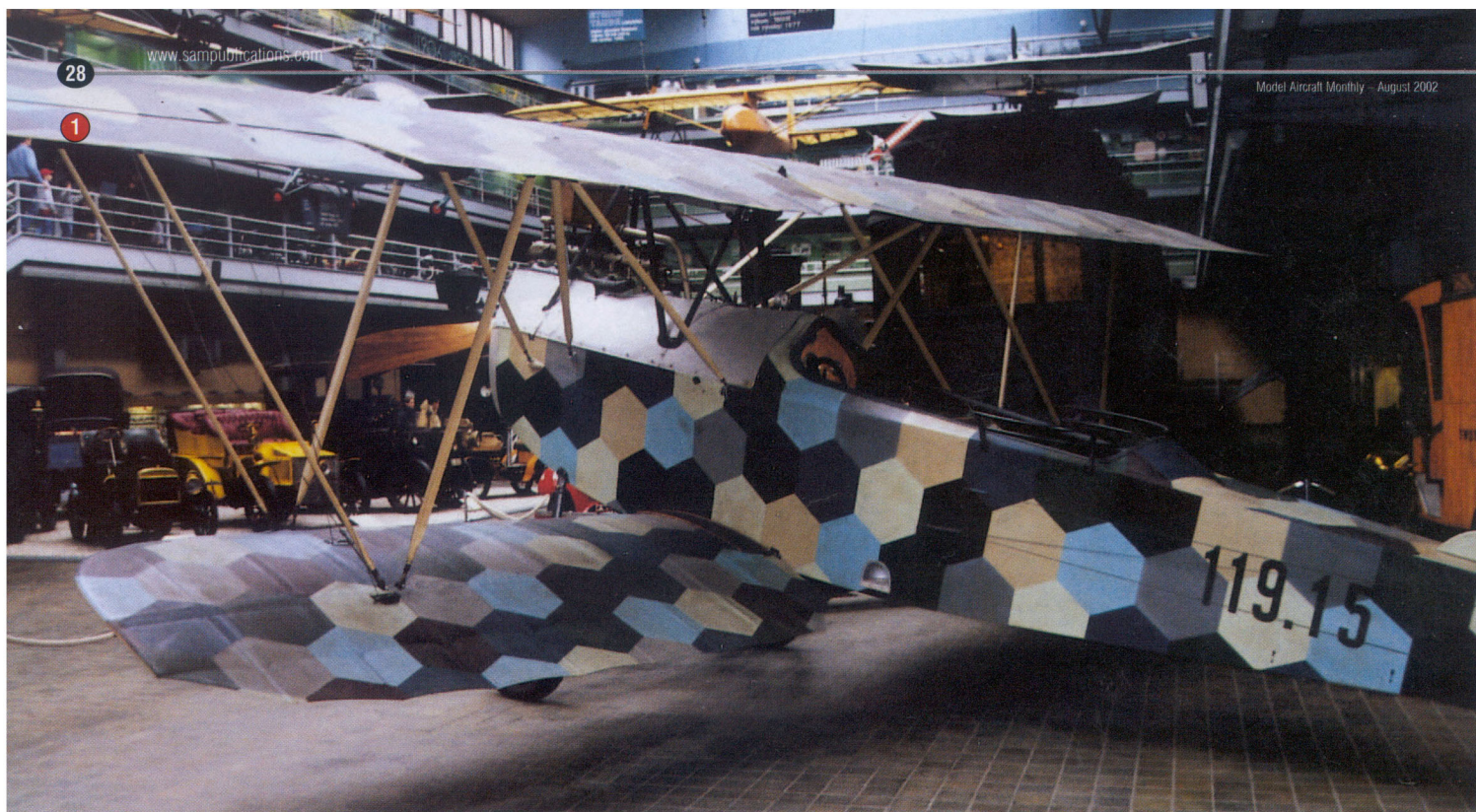
21. Access ladder

22. Sea Harriers and RAF Harriers during a 'JHF' exercise
(©BAe Systems)

23. New colours!
(Graham Causier)

All photos © Andy Evans unless otherwise stated





Knoller C-I and C-II

by Jim Grant

Designed in 1916 by Professor Richard Knoller of the KK Technischchen Hochschule (Vienna Technical School) this two-seat reconnaissance aircraft was ordered into production in C-I and C-II versions before the prototype made its first flight. A total of seventy-five aircraft were ordered in batches of twenty-five from three companies. Aviatik were to produce the Series 36 and 136, Lohner the Series 19 and 119 and WKF were to build only the Series 81. It is possible, but unconfirmed, that Series 19 and 36 were C-Is.

The C-I was powered by a 160hp Austro-Daimler inline engine and the C-II by a 185hp version of the same engine. The total number of both types of C class aircraft built is unknown but twelve aircraft were completed by Thone und Fialla, possibly under a subcontract from one of the original firms, as unarmed B.Is (series 35) and these were reputedly issued directly to a training school.

The first three C class aircraft were delivered to Aspern Aerodrome in September 1916. All were Aviatik built Series 36 but during a test flight on February 10th, 1917, both wing structures on the aircraft collapsed and the crew were killed in the resulting crash. Production was cancelled immediately and all completed aircraft were placed in storage. It would seem that this was not the first indication that the aircraft was unsatisfactory.

Construction of the C-I and C-II was of wood with fabric covering on the wing and plywood on the fuselage; metal panels were fitted around the engine, the propeller was wood, the radiator was placed just below the upper wing, immediately in front of the pilot which did nothing for his forward view. The wing bracing is unusual in that it employs a system of 'W' shaped struts similar to that adopted for the Ansaldo SV-5 and later by Fiat biplane fighters of the 1920s and 30s.

A number of aircraft had been stored near Prague and following the break up of the Austro-Hungarian Empire in 1918/19 these were delivered to the newly formed Czechoslovakian Air Force but the aircraft proved so unsatisfactory that even an emerging air force could find no use for them. The museum's aircraft was restored during 1987 and 1988 and was repainted in a slightly different colour scheme from the original.

The sole surviving aircraft is a Lohner built C-II serial number 119.15 which is currently on display at the National Technical Museum in central Prague. It was donated to the Museum in 1919 without an engine but later one became available to complete the aircraft.

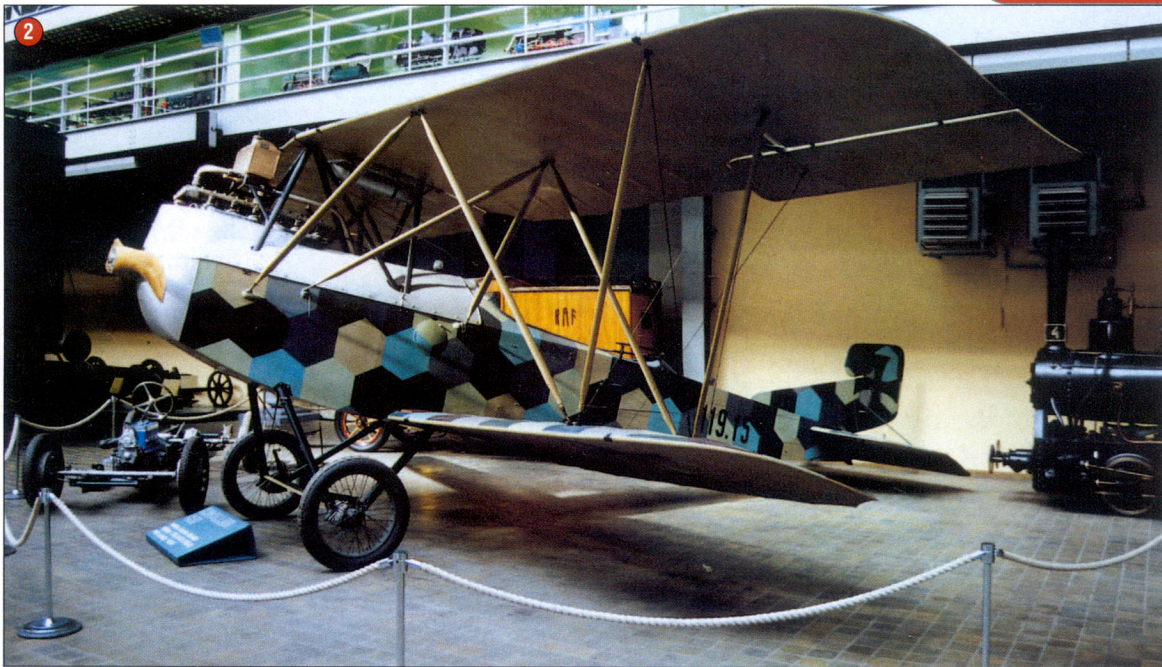
• **Colour scheme:** The wing upper surfaces and the fuselage top and sides were covered in a large lozenge pattern using mid grey, beige, pale blue, dark blue, black, off-white, dark green and dark brown with medium beige under surfaces and light beige wing struts.

The undercarriage struts, wired wheels and tail skid are black. The radiator is light grey and the gravity tank is silver. Serial numbers are black. Black Austro-Hungarian crosses appear on the upper surfaces of the wings and on both sides of the tailplane. **MAM**

1, 2 & 3. 119.15
Knoller C-II, the KuK
Luftfahrtruppen had
great hopes for this
aircraft but it was not
to be

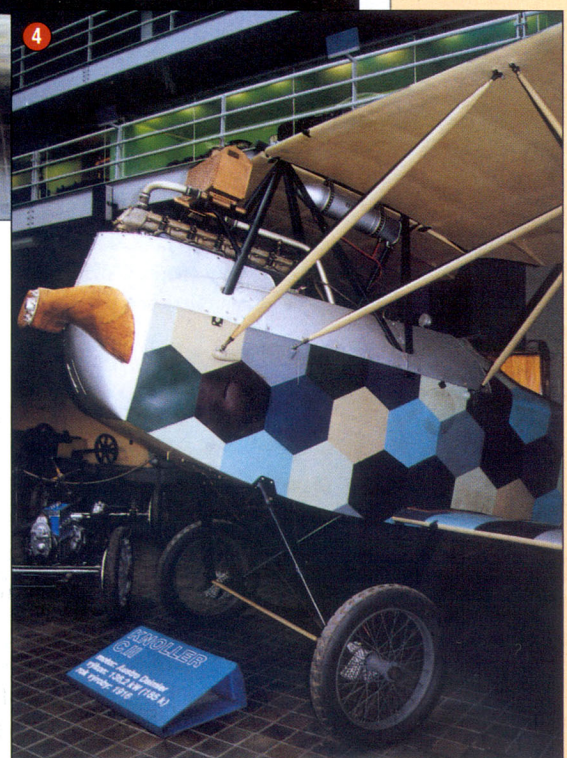
Sources

- Aircraft of World War 1 by Kenneth Munson
- WWI Survivors by Ray Rimell
- Information from the Museum



4. Close-up of the nose section of 119.15

5. This monochrome photograph shows an aircraft with what appears to be a plain varnished fuselage?





Polish example of the Li-2 at the Polish Aviation Museum in Krakow

Lisunov Li-2

by Paul Rigby

Between November 1936 and April 1939, in Santa Monica, USA, Boris Pavlovich Lisunov, a citizen of the Soviet Union, studied, scrutinised, crawled over and poked his head into every nook and cranny of one of the most well-known and respected aircraft of all time – the DC-3. B.P. Lisunov was the engineer selected to supervise the technical side of a license agreement between the USA and the USSR in which the Soviet Union would have permission to build the DC-3. The license agreement, which was struck with Douglas Aircraft but never paid for, was sealed in 1938. Lisunov arrived home with the relevant tooling and in-service support knowledge and then promptly set to work – not to copy the DC-3, as was generally thought, but to change and adapt it to the Soviet service.

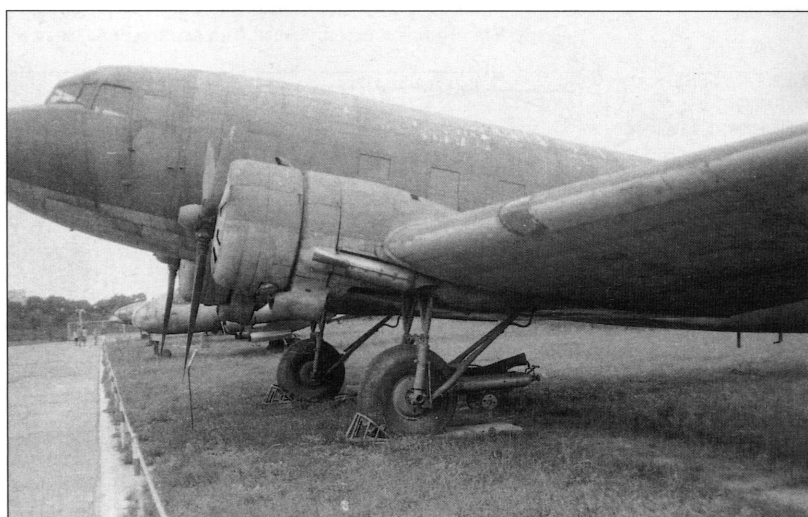
There were, in total, 1,293 separate engineering changes made to the original DC-3. The result was known as the PS-84, which stemmed from the label 'Passenger aircraft No.84' which, in turn, originated from the factory it was built in, Factory No.84 at Khimki. The main changes included the changing of the license built Wright SGR-1820F engines, as used on the DC-2, (known in Soviet service as the M25) to the Shvetsov M-62 radials. This engine produced about 300hp less than the standard Wright DC-3 counterparts and, thus, the performance suffered. The baggage door was moved to the port side and the passenger door was positioned on the starboard side only. The number of passenger windows was also dropped to seven. A significant, but easily missed change was the reduction in overall span by 15cm, a reduction of 40sq.cm. in wing area. Other changes centred around the undercarriage, which could now carry skis, and the general strengthening of some areas of the airframe by increasing the thickness of the skin.

This model, therefore, changes et al, was redesignated in

recognition of the achievements of Boris P. Lisunov as the Lisunov Li-2P on the 17th September 1942. The initial variant entered service with Aeroflot and could carry from 14-28 people. Other variants quickly followed with the Li-2GP (or PG) which could carry freight and 15 passengers and the dedicated cargo version Li-2G [Grazhdanskii – Civil] which had a payload of 5500lbs.

With the success of the civil variant the military began to take an interest. A variant known as the Li-2T [Transportnyi] was developed with the possible option of fitting a turret in the mid-upper position holding one or two 7.62mm shKAS machine-guns. One shKAS was also positioned either side of the rear fuselage and openings in the windows allowed soldiers to fire through. A testament to these protective provisions is the

The port side of the Li-2 displays the additional window added behind the flight deck above the aircraft door



fact that 21 aircraft were shot down by the 10 Guards Air Transport Division during World War Two. Other offensive armament consisted of a bomb load of 1000kg and fittings for under-wing rockets.

Structural differences included the deletion of the window forward and to port of the flight deck but with the addition of port and starboard windows to the rear of the flight deck. The Li-2T carried four crew and a possible 20 soldiers. However the military realised that they required a transport aircraft which could carry out airborne assault duties. The Li-2D [Desantnyi – Airborne Assault] was born. The 'D' was fitted with a glider tow-hook and equipment suitable for parachute drops. In addition, a glazed port forward door was fitted which enabled the crew to observe the dropping of airborne troops and also assisted in minor changes in flight attitude and direction.

The Li-2 gave excellent and invaluable service to the Soviets during World War Two. A factor being improved engines (AsH-62IR giving 1,000hp) that were fitted at this time. However, accounts documenting this service are relatively scarce compared to accounts of DC-s in the Western Theatre. One source of information is 'The Soviet Air Force in World War II' which is the official history distributed by the Soviet Ministry of Defence. The book is rather provincial in its scope and introduces a large element of Communist policies. It does, however, still give an interesting and full account of Soviet operations. Two excerpts are presented below in an attempt to give the reader a taste of the Li-2s involvement in the war and to help the reader visualise this particular aircraft as a Soviet combat aircraft:

"The Mechanised Cavalry Group under General I.A. Pliyev broke through deep into the enemy's rear and appeared to be cut off from our lines. It was essential to give it immediate aid. Six transports, Li-2s, with six fighters for escorts had to locate our cavalry units in the enemy's rear and drop supplies for them. Directly over the front, 12 German fighter planes



The starboard side of the Li-2. This is a particularly good detail view of the undercarriage, engine side and associated access panels

attacked our aircraft. The situation was developing in the enemy's favour. Over his aircraft's radio, Captain Koldunov gave his fighter planes the command to attack and flew straight at the lead plane. It seemed as though a collision was inevitable, but the German flyers could not stand the tension, and turned sharply aside and up. A short burst of machine gun and cannon fire triggered by Koldunov shot down a second enemy plane at close range. After covering our Li-2's at long range the fighter planes left the battle. The transport planes dropped their precious cargo at the right place and returned to the airfield without any losses." (page 243)

"Transport units were widely used to deliver supplies to Air Units, Tank Corps, and Mechanised Cavalry Groups. The civil air fleet transport regiments flew about 35,000 sorties and transported more than 43,000 men, and Li-2s of the AFLRO transported 11,000 men and around 3,500 tons of cargo." (Note: AFLRO = Air Force Long Range Operations)

As can be seen above the Li-2s gave a major contribution. Also, within the book, mention is made of an uprising which occurred during the war in Czechoslovakia. To support this action a squadron of LA-5s flew into the country itself, behind enemy lines with Czechoslovakian pilots. Once on temporary station regular flights of Li-2s transported fuel and extra supplies at low level and at night in an attempt to keep the momentum going. The uprising petered out and the aircraft returned to the Soviet Union but this, and the other accounts, show that the Li-2s were thrown right into the thick of the action undergoing missions which needed a dependable aircraft that would do the job and do it well.

As with any popular aircraft, variants were built to do a multitude of tasks. The Li-2R [Razvyedchik - Reconnaissance] was built as a reconnaissance and survey aircraft with the addition of bulging starboard windows fitted to the flight deck. A related variant was used for casualty evacuation. Another variant, the Li-2DB was fitted with long range tanks. Finally, the Li-2V (or W) used engines fitted with superchargers which increased the ceiling to 8,000m. It was used for meteorological research and for high level passenger travel.

Of the 2,000 Li-2s built, many still survive. Some have been used as test-beds such as those used to test the AM-88 and AsH-82 engines or the example that was fitted with the caterpillar tracks as opposed to wheels! Even though one or two examples have been retired to the museum (CCCP-93914, which is an ex-Aeroflot example, at Monino) some still soldier on as steady workhorses transporting passengers and cargo. One was sighted being flown by CAAC (China) in Peking in May 1987, another in October 1986 being flown by Industrial Aviation Service Corp in Taiyaun. **MAM**

In this close up of the Ash-62IR notice the front slotted baffle which is fitted over the engine cylinders. Far from being an engine cover this baffle helped to reduce the extremely cold airflow experienced during the winter months



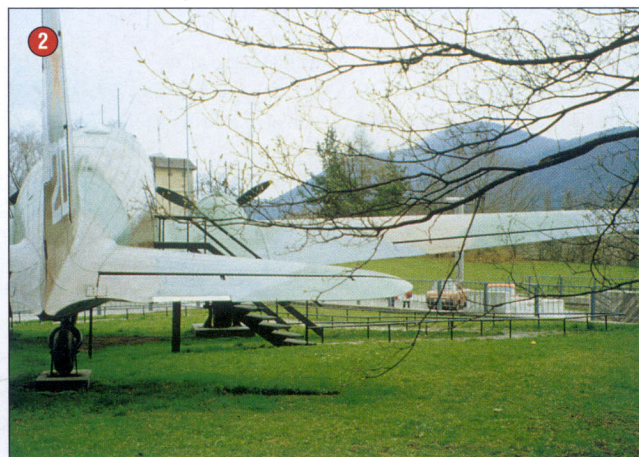


Photo Album

LISUNOV LI-2 by Greg Kerry

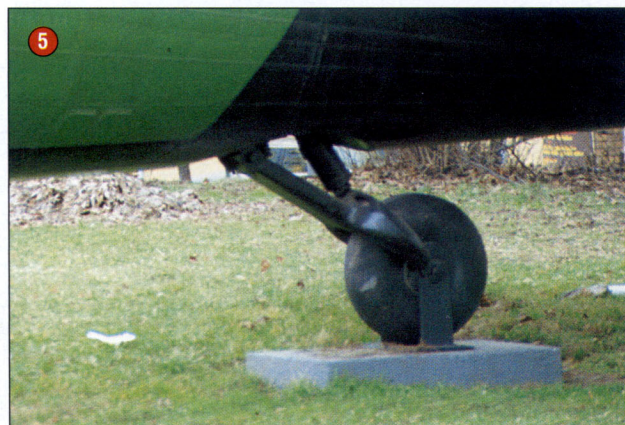
1. Museum of the Slovak National Uprising and a view of the Li-2s tail and port wing showing the earth/grey/green camouflage pattern

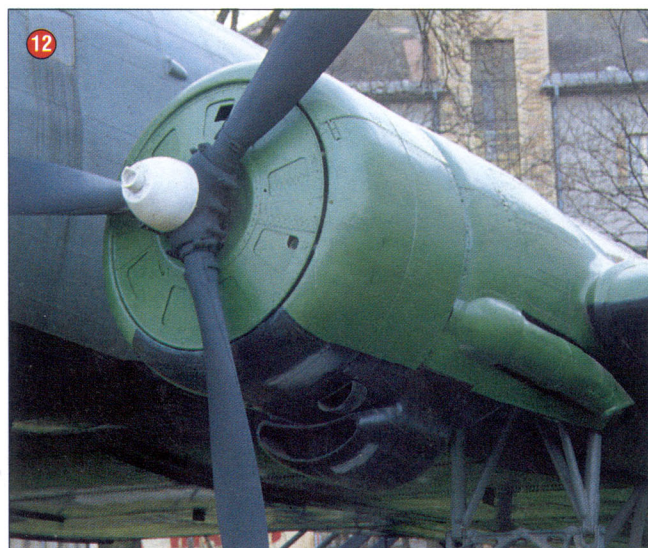
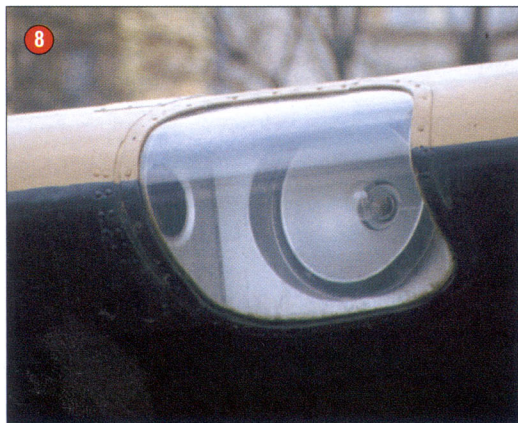
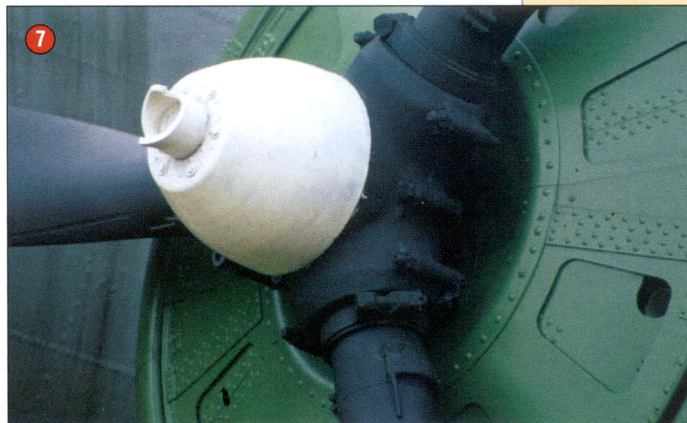
2. A similar view showing starboard wing and tail assembly

3. Starboard nose and engine detail. Note the extra side window

4. Port nose detail showing various aerials and the cockpit entry door

5. Tail wheel detail: subtly different from the original DC-3





6. Intakes beneath the port engine cowling

7. Propeller boss and hub detail

8. Landing light in port wing, but note that there is no sign of de-icing boots

9. Underwing detail showing large Soviet insignia overlapping the aileron. Also to be noted here is the main fuselage entry door. The Li-2 lacked the large doors which were such a prominent feature of the DC-3

10. Port tail detail. Note the small intake just forward of the stabiliser

11. Port undercarriage leg. Here too there are subtle differences from the DC-3

12. The square shape of the engine cowling is well shown here, as is the flat cover hiding the AsH engine

13. General shot of the Li-2. Authenticity of paint scheme and markings cannot be guaranteed



AT11 viewed from the front

Colourful Birds

SPECIAL SCHEMES NO.3

by W. Henderickx

The subject of this feature is the Dassault-Breguet Alpha Jet 'AT11' of the Belgium Air Force. This machine was flown by Commandant Danny Payeur. [MAM](#)

Close-up of the port side of the cockpit area





1. Overall shot of AT11 from the rear
2. Commandant Danny Payeur getting about AT11
3. An overall shot of AT11 taking off



1 & 2. Harbin H-5 of
the Rumanian Air
Force - Fetesti airbase,
May 1999

3, 4 & 5. Port side
view

6. Being towed away

7. Number 709 with
covers on



Photo Album

ILYUSHIN IL-28 (BEAGLE)

by Ken Duffey





8. Retired Rumanian AF H-5 at Bacau Air Force Base, May 1999

9. Another H-5, Bacau

10. H-5 number 708

11. Soviet Ilyushin IL-28 exhibited at Khodynka museum, central Moscow

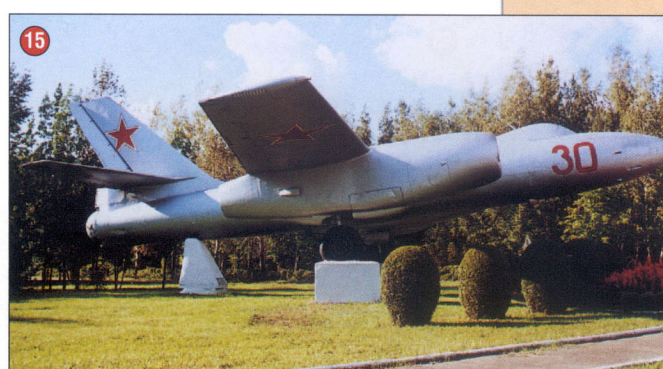
12. IL-28, Khodynka

13. Soviet IL-28, Central Armed Forces Museum, Moscow



14. Soviet IL-28 in a museum at Ulyanovsk, Russia

15. IL-28 'gate guard' at the LMZ plant, Lukhovitsy, Russia



16. Polish Air Force
Il-28, Deblin, Poland

17. Polish Il-28R,
Muzeum Lotnictwa
Polskiego, Krakow,
Poland. Note the tip
tanks

18. Hungarian Air
Force Il-28, Szolnok,
Hungary

19. Hungarian AF
Il-28, Szolnok

20. Rumanian Air
Force Il-28U, Bacau,
Rumania

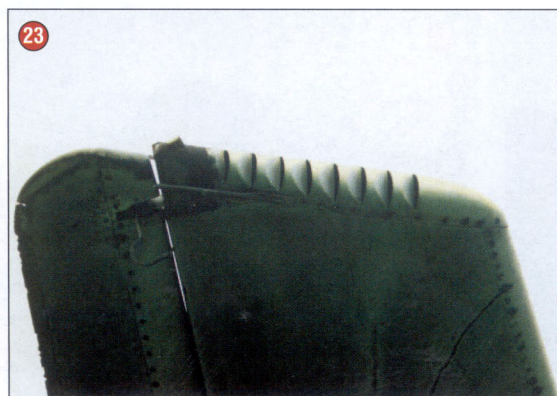


21. Polish Il-28,
Krakow, Poland

22. Nose area on the
Il-28U (NATO
reporting name,
Mascot). The
instructor occupies
the front cockpit

23. Starboard wing tip
on Il-28

24. Port wing tip fuel
tank on Il-28R





25. Rear gun turret on IL-28 with twin 23mm cannon

26. Another view of the rear gun turret

27. Rear turret on the Harbin H-5. Note the differences from the IL-28

28. Another view of the rear turret. Note the gunner's access hatch

29. Windscreen and pilot's console on the H-5

30. Pilot's seat headrest and canopy

31. Cockpit view showing the control column, ejection seat and right console

32. Pilot's instrument panel and control column

33. Quilted inside cover on navigator's hatch

34. Another view of the control column

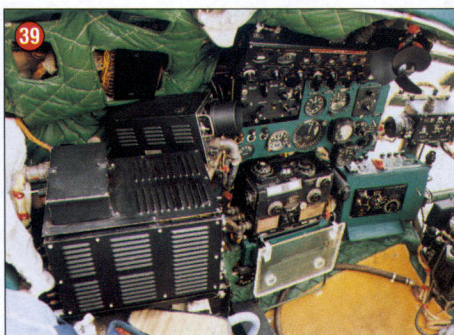
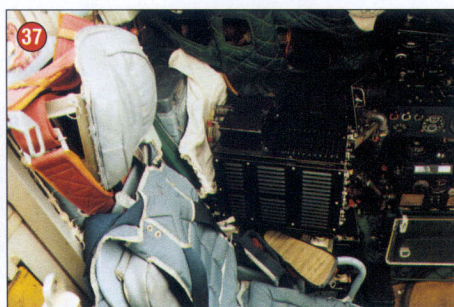
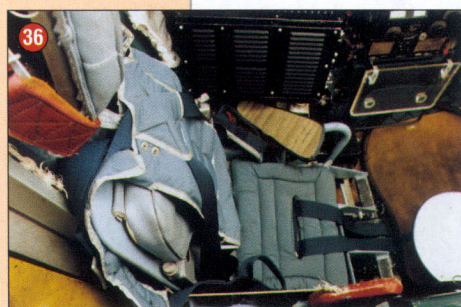
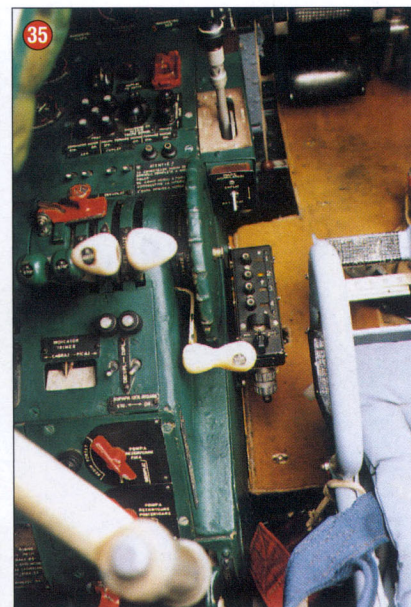
35. Left-hand console showing twin throttles with white handles and trim wheel

36. Navigator's ejection seat

37. Ejection seat headrest

38. Looking down into the nose compartment

39. Left hand side of the navigator's compartment



40. External view of the nose glazing. Note the muzzle on the 23mm cannon

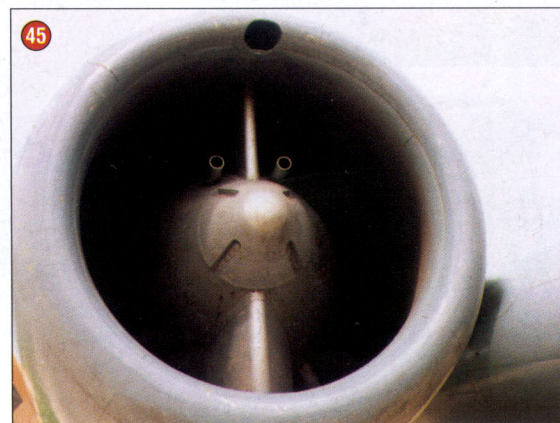
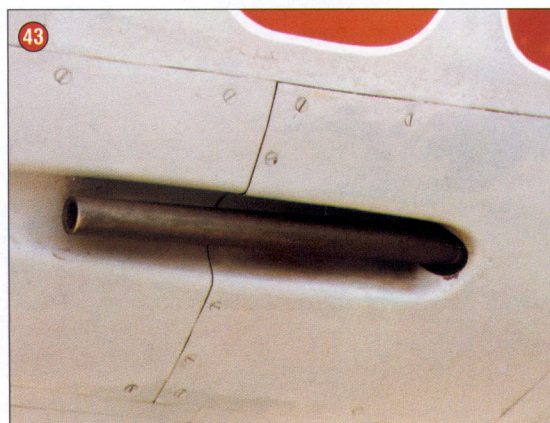
41. Navigator's 'bomb-aiming' flat panel

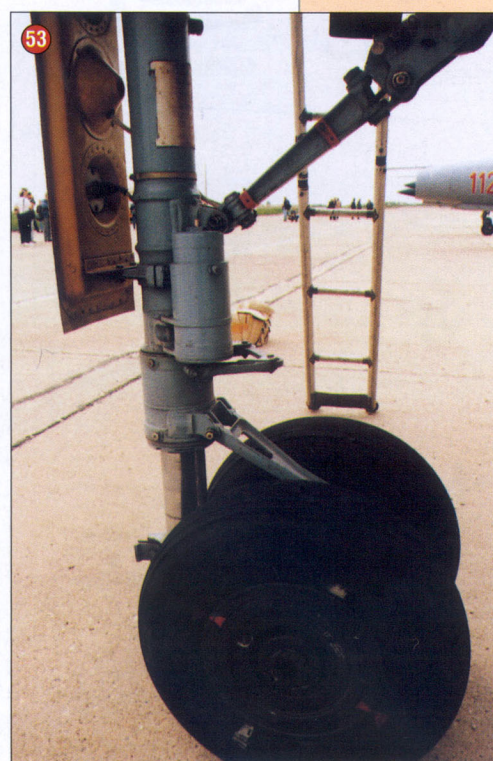
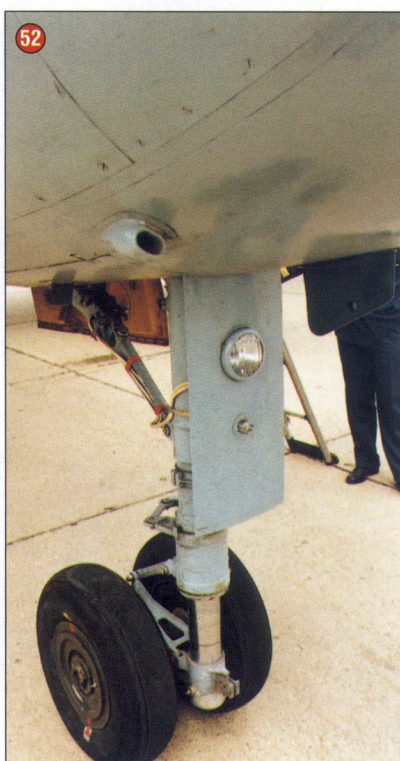
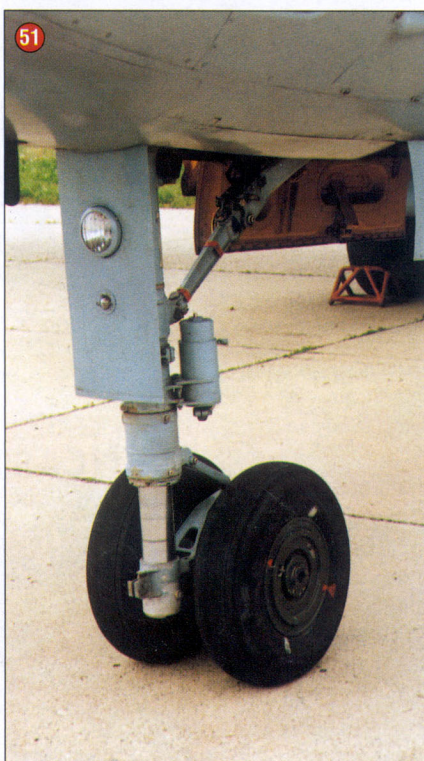
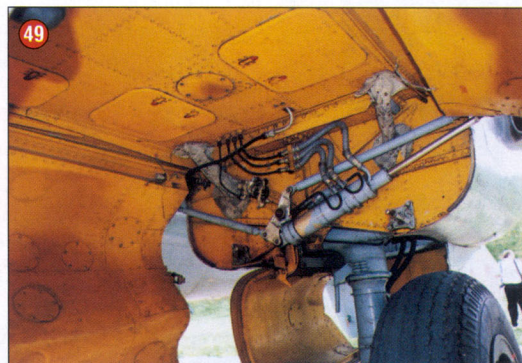
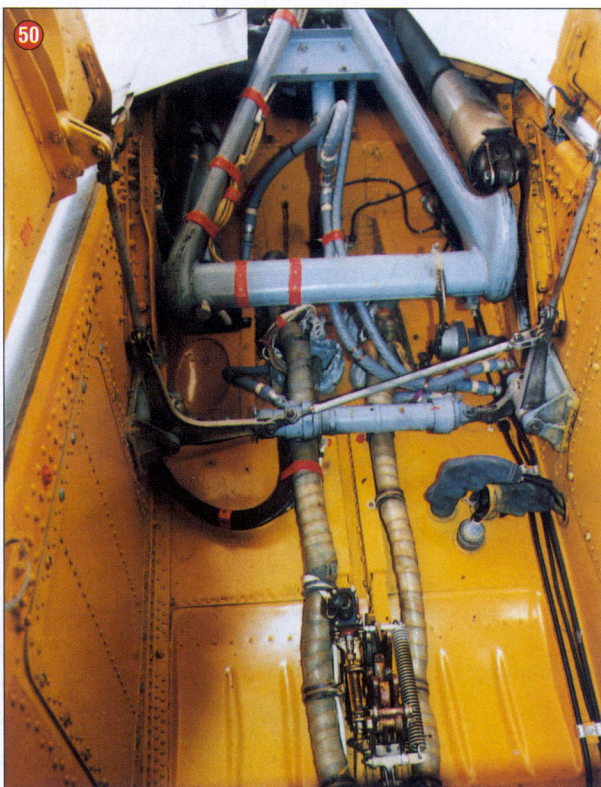
42. Chaff/Flare dispensers and aerial by the front wheel doors

43. 23mm cannon barrel

44. Retractable landing light in starboard engine nacelle

45. Starboard engine intake. The WK-1 engine is essentially, a RR Nene!





46. View of the starboard engine nacelle

47. Tail gunner's entrance/escape hatch

48. Port mainwheel

49. Port undercarriage bay looking rearwards

50. Undercarriage bay roof

51. Nosewheel port side

52. Nose wheel from the starboard side

53. Side view of the nose gear showing the front cover attached to the leg